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PREFACE.

THE issue of the December number terminates another volume of 'THE ZOOLOGIST,' and, although our pages have been necessarily—and, we hope, temporarily—reduced to the status of a previous standard, our contributors have worthily upheld the zoological position of the Journal.

IN MAMMALIA, during what we may call the "*Okapia*" year, we have published full obituary notices of the Quagga (*Equus quagga*), and the Blaauwbok (*Hippotragus leucophæus*), and given illustrations of those now apparently extinct South African animals; while from the same region we have received an explanation of some tradition respecting the Scaly Ant-Eater (*Mnis temmincki*). Our own British species have not been neglected, and the notes thereon are as full and interesting as usual.

Of course, in AVES we have found our strength, and the papers and notes thereon show no diminution in the activity of our ornithological contributors. Among so much information we can here refer to few features, but the record of the Wigeon (*Mareca penelope*) breeding in Ireland, and that of the American Wigeon (*M. americana*) breeding in Iceland, are new facts of the highest ornithological interest.

REPTILIA have not incited so many recorded observations as might have been wished, but we have noticed the publication of a book on British species, in which is reproduced much that had been previously recorded by the author in these pages.

PISCES.—We are still anxious for more information on this subject in 'THE ZOOLOGIST.' At present there is a distinct 'slump' in Fish contributions. Perhaps the most interesting word we received was that of the occurrence of the File-Fish (*alistes capriscus*) off Brighton.

Other Orders of British animal life seem, so far as our pages are concerned, to excite small interest. We hope in future volumes that this cannot be said.

Another feature in 1901 has been a biographical element, or what we may venture to style a commencement of "patristic zoology." Thus we have had an appreciation of "Dante as a Naturalist," and a most interesting paper on "Early Ornithologists," written, alas! by an old contributor whose valued communications we shall never receive again.

Everywhere Zoology is an advancing science. This year the International Congress held its meeting at Berlin, while the publication of books relating to animal life is ever on the increase; and, though much of this literature may be of a compilative description, and designed for "popular" uses, it still proves that the reading public are not uninterested in the animal life around them. On all sides Zoology receives a fresh support. It is no longer the sluggard who is bid to study the way of the Ant, but the philosopher, and even the politician. Evolution has received its strongest credentials from Zoology, and Evolution is now a force recognized as much in the life of the city as in that of the fields. We can realize the past when the zoologist would be considered a "crank"; we well understand the modern equivalent of estimating the science as a "hobby"; but it only remains for zoologists to render it one of the factors in assisting to explain the mysteries of our own existence; and this may perhaps be best achieved by the bionomical method of 'THE ZOOLOGIST.'

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BIRD NOTES FROM BREMBANA VALLEY.

BY PROF. E. ARRIGONI DEGLI ODDI,
Member of the International Ornithological Committee.

AMONGST the Italian provinces, ornithologically speaking, Bergamo is one of the less known. It was illustrated indeed, many years ago, by Maironi da Ponte,* but his catalogues are simple lists, full of all the mistakes of that epoch, and cannot positively be relied on to-day; besides, Bergamo is sometimes mentioned in the excellent works of Salvadori and Giglioli, especially with regard to Count Camozzi's beautiful and interesting local collection; Stefanini, an unhappy stay-at-home bird-skinner, who died from having cut himself in stuffing a lion that had succumbed to an illness, has written a list for the Italian Ornithological Fauna, but it is very incomplete. Arrigoni† has written about the history of Valsassina and neighbouring countries, adding a catalogue of the birds, which for its simplicity is not worth mentioning; I have also in two notes spoken about some abnormal coloured specimens of birds and hybrids preserved in the Museum of Bergamo; and, finally, the Rev. Caffi‡ published, in a pamphlet, the Ornithological Dictionary of the Province, in

* 'Dizionario Odeporico della Prov. di Bergamo.' Bergamo, 1819. The same, 'I Tre Regni della Natura nella Prov. Bergamasca' (Atti Soc. Ital. Sc., tom. xix.).

† 'Notizie Storiche della Valsassina e delle terre limitrofe ecc.' Lecco, 1889.

‡ 'Saggio di un Dizionario dell' Avifauna Bergamasca.' Bergamo, 1898.
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which he gives very shortly the local and scientific names of the birds, and some remarks as to their frequency, which I suspect are not always satisfactory. Beyond the above-mentioned literature we possess nothing else.

There is no doubt that, for ornithology, this is one of the most famous amongst the Italian Provinces. Its position, the abundance of streams, springs, and rivers, its thick woods, and elevated mountains are very suitable for birds of passage, and the quantity of them caught, by all kinds of devices, and brought to the markets is enormous. My esteemed friend the Rev. H. A. Macpherson has written very fully on this point in his well-known book.* Amongst the rarest birds which have appeared here and which afford an idea of the real importance that Bergamo holds in the Italian Provinces, I may mention *Gypaëtus barbatus*, *Glaucidium passerinum*, *Turdus fuscatus*, *Loxia bifasciata*, *Pinicola enucleator*, all of which are very seldom seen in the Italian sub-region.

Having spent some time in the Brembana Valley, one of the finest of this Province, I thought it might be useful and interesting to publish some notes about these places, which I believe are amongst the most unknown spots to ornithologists. In my researches I have been greatly helped by an intelligent but modest person, Dr. Peter Giacomelli, chemist, of S. Giovanni Bianco. He has lived there the last four years, having been obliged to leave his fatherland, Rovereto in Trentino, on account of unfortunate political questions with Austria. Before this he had been acclaimed in both natural sciences and chemistry at the celebrated University of Innsbruck; while he knows very well indeed many branches of our science. In order to collect minerals, for which he has an especial inclination, he made many trips and ascensions here and there, and we may say that he is now acquainted with everything that appears or lies in these beautiful places. I obtained from him all the local names, and much of the information I am now giving; so I have the pleasure of declaring here how deeply I am indebted to him for his kindness in helping me so much and so well.

The Brembana Valley † is the widest and the most picturesque

* 'History of Fowling.' Edinburgh, 1887.

† Club Alpino Italiano, 'Prealpi Bergamasche,' p. 116 and follow. Milano, 1900.

amongst the valleys of Bergamo. It extends toward the north to Valtellina, to the west with Valsassina, and to the east with Seriana, like the latter being directed from north to south; and finally it ends in the open plain a few miles from Bergamo. It occupies about 774 square kilometres, and has a population of some 40,000 inhabitants. In its inferior part the river Brembo runs through a rather narrow depression, which at certain points is nothing but a defile, but it receives some important streams, such as Serina and Parina on the left, and Brembilla and Taleggio on the right. Where it meets the open plain it is swollen by the Imagna, which at first washes the Imagna Valley. Beyond Piazza the river divides into two branches, which are called Brembo of Val Fondra on the east, and Brembo of Val Mezzoldo on the west. Further on the basin of the river becomes distinctly enlarged, while these branches are again divided. The first forms the Valsecca, the Glen of Carona, and those of Foppolo; and the other the Valtorta, the Mora Glen, and the Mezzoldo Glen properly named. Spreading itself here and there towards the north, the Brembo receives, for a tract of thirty kilometres, the waters of the principal Orobica ridge from the Pizzo del Diavolo di Tenda (8882 ft.*) to the Pizzo dei Tre Signori (7773 ft.). In this system we also observe Mount Aga (8285 ft.), Mount Masoni (8150 ft.), and Corno Stella (7983 ft.), well known for the splendid panorama that can be seen from its summit. Other important summits are the Zuc di Cam (6714 ft.), and a part of the Resegone (5716 ft.), Pizzo Torretta (8150 ft.), Cima di Becco (7654 ft.), Mount Spondone (7468 ft.), Mount Aralalta (6112 ft.), and very many more.

In the Brembana Valley and its mountains small resident birds do not greatly abound; one may walk about all day long without finding a single example; but during the migrations birds are very common, and then there are flocks of a hundred specimens and more. Gallinaceous birds are, as I shall say further on, tolerably abundant on the suitable localities. Many mountainous passes or other fit spots are covered with nets, traps, and different kinds of devices, amongst them the best known and productive being the "Roccolo," of which the most famous in the Brembana Valley are the following:—Roccolo

* A foot equals .3048 of a meter, or 12 inches.

Oneta (about 2000 ft.), owner Dr. Morali; Rocolo Costa S. Gallo (about 2500 ft.), owner Sign. Luiselli; Rocolo Ornica (about 2850 ft.), owner Sign. Gualteroni; Rocolo of the Trinità, near Dossena (about 3050 ft.); Rocolo Valbusa (about 4000 ft.), and those, above Roncobello, which lie at about 4300 ft. It is very difficult to ascertain how many birds are caught in a period of about three months; we can say an enormous quantity, but envy, diffidence, and other qualifications render an estimate difficult, though it is certain that many "Rocoli" yearly capture several thousands of small birds. Another matter which adds to the difficulty of collecting birds is the quantity eaten by the inhabitants. If the rich seek the delicate ones, the poor are satisfied with anything; even Buzzards, Owls, and Woodpeckers are as readily eaten by them as the Woodcock or the Capercaille!

The climate is neither very cold, nor very warm even in summer; the snow is not continuous on the high mountains, but only on some narrow northerly situated spots.

The Brembana Valley, more than the rugged Seriana Valley, offers to the traveller a greater variety and beauty in scenery, a most luxuriant vegetation, and also, not to be despised, many artistic treasures; amongst which may be mentioned the pictures of Palma il Vecchio and others, which are well-known to everybody and everywhere.

The Bearded Vulture (*Gypaëtus barbatus*, v. Agola) lived in these mountains in former years; but is probably now extinct, though a specimen was recently caught—I think between 1896 and 1897—not very far from Camerata Cornello (1800 ft.). I am quite sure about this fact, as I had the opportunity of seeing and purchasing six well-preserved tail-feathers in the house of a mountaineer, and these are preserved in my collection as a proof of that occurrence. The feathered portion of them measures from about ten to thirteen inches. I think, from the comparisons I made with splendid specimens from Sardinia, they must have belonged to a matured bird. People say that this species breeds not seldom on the cliffs of Mount Legnone (8226 ft.), but I think that affirmation is absolutely incorrect. The species is represented in Count Camozzi's local and well-known ornithological collection at Ranica, near Bergamo; but the two specimens came from Valtellina (Sondrio), as my friend Count Cesare Camozzi-Vertova

informed me. They were caught before 1848, and one which was brought alive and lived some time subsequently became so wild that it was found necessary to kill it. Count Camozzi added also that his illustrious father, Senator Camozzi, has seen this species on flight before 1848. The specimen preserved in Count Turati's collection at Milan, labelled as caught on the Alps of Lombardy in 1868, came instead from Switzerland, as I was assured by Signor Bonomi, whose father preserved and set up that grand bird.

Amongst the *Aquilæ*, the Golden Eagle (*Aquila chrysaetos*) is not very rare; it breeds in some very high spots in these mountains, and it is not very seldom seen flying on the above-mentioned Pizzo dei Tre Signori and Pizzo del Diavolo di Tenda, on Mount Cervo (7675 ft.), Mount Pegherolo (7221 ft.), Mount Pietra Quadra (6982 ft.), and in the mountains towards Como. Dr. Giacomelli told me that in the month of May last year he was offered two very young nestlings, taken from Cancerbero (4027 ft.), of the size of a full-grown fowl, for about one shilling each; they were almost totally covered with white down; but he refused to buy them, not knowing what to do with them. I have no local information about the other Italian *Aquilinæ*, but it seems that a specimen of the Lesser Spotted Eagle (*A. maculata*) was found dead, on May 1st of last year, by Dr. Giacomelli himself, on the north side of the Somnadello * sink-pit (4814 ft.); it had been, some days before, severely wounded on the back, and was then so decomposed that it was impossible to preserve it; its skull, however, compared with that of *A. clanga* appeared quite different from the latter, and belonging to the lesser form, which is more uncommon in Italy. The information about the White-tailed Eagle (*Haliaëtus albicilla*) is very uncertain and contradictory, and cannot be relied upon. The Short-toed Eagle (*Circaëtus gallicus*) and Osprey (*Pandion haliaëtus*) appear but very seldom.

Amongst the *Buteoninæ*, the Rough-legged Buzzard (*Archibuteo lagopus*) is very rare; it has appeared only on the most frigid days of severe winters, and I saw the remains of a specimen caught on Mount Azzarini (7307 ft.) in January, 1898. The

* Some people call it Sornadello, but the Guide of the C. A. J. and the military maps of the Geographical Institute of Florence name it as above.

Honey Buzzard is very rare also. The Buzzard is met with everywhere, but not found very high; while the Long-legged Buzzard (*Buteo ferox*) is till now unknown. The Black Kite (*Milvus ater*, v. niblet, nèbel) is rare, but a breeding species; and I think it is the same with the Common Kite (*Milvus iclinus*); I saw the former not very far from Roncobello (3074 ft.), but I was unable to secure it. The Gos-Hawk (*Astur palumbarius*) is fairly abundant during summer in the mountainous woods; and the Sparrow-Hawk is one of the most common local rapacious birds.

Amongst the other rapacious birds, *Gennaja* are unknown, and certainly unrecorded up to now. The Peregrine Falcon (*Falco peregrinus*, v. falcón di barbiss) is pretty common, but not easily found, in the high mountains. I saw the Merlin (*Æsalon regulus*) at the Hill di Valpiana (3166 ft.), but I was unable to shoot it; and I heard that the Red-footed Falcon (*Erythrops vespertinus*) in some years is not rare during May in certain mountain meadows (Passo di Grialeggio, 5209 ft., Monte Aralalta, Monte Ortighera, 5009 ft.); I obtained a specimen for my collection from S. Pietro d'Orzio (1877 ft.) on May 10th, 1894. The Kestrel (*Tinnunculus alaudarius*) is met with also at the top of the highest mountains, and I secured a specimen for my collection at the Zuccone dei Campelli, at about 6094 ft.. Regarding the other small Falcons I lack information.

The Marsh-Harrier (*Circus æruginosus*, v. Falchèt d'aqua), the Hen-Harrier (*C. cyaneus*), and perhaps Montagu's Harrier (*C. cineraceus*), are met with but very seldom; they generally frequent the marshes, and here they appear almost like stragglers, especially the two latter.

Regarding the nocturnal birds of prey, I noticed the Barn-Owl (*Strix flammea*, v. Dàma, Loch bianca), which is met with up to 3000 ft. in height, and is fairly abundant, but specimens with the under-parts white seem to be very rare. The Short-eared Owl (*Asio otus*, v. Loch) and the Long-eared Owl (*A. accipitrinus*, v. Loch, L. gross) are common and breeding species. The Scops Owl (*Scops giu*, v. Sisöl) is a summer visitor, fairly frequent, and breeding. The Tawny Owl (*Syrnium aluco*) is not unfrequent; while the Ural Owl (*S. uralense*) has not hitherto been observed. Tengmalm's Owl (*Nyctala tengmalmi*) is rather scarce; the Pigmy

Owl (*Glaucidium passerinum*) is very rare, perhaps quite localized; while the very imposing Eagle-Owl (*Bubo ignavus*, v. Duss, Lucù) is met with to about 4600 ft. in height, and in the woods of fallen leaves, showing itself very seldom in the ever-green ones; it feeds upon rats and birds; sometimes it enters small villages, and it was observed in those of Fuipiano (1411 ft.), S. Giovanni Bianco (1219 ft.), S. Gallo (1294 ft.), Ornica (2805 ft.), and some others; it is a resident and breeding species.

Amongst the *Picidæ* we observe tolerably common and resident the Green Woodpecker (*Gecinus viridis*, v. Picòss vert, Beca soch) and the Great Spotted Woodpecker (*Dendrocopus major*, v. Picalègn ross, Picòss gross); the Grey-headed Green Woodpecker (*G. canus*) was only once observed, but I think, if exhaustive enquiries are made, it will be found to occur more frequently; Dr. Giacomelli told me that the only specimen was caught not very far from the top of Cima di Grem (6243 ft.); it was shot by a priest, who presented it to a friend of his. The Great Black Woodpecker (*Picus martius*, v. Picòss nigher) is easily found in the wildest woods of some mountains, where it is almost restricted to a height of no more than 4900 ft.; in winter it descends a little; we are informed that it was found at Mount Combana (7192 ft.), Pizzo dei Tre Signori, Mount Ponteranica (7550 ft.), Mount Cavallo (7081 ft.), but, as I have said, not above 4900 ft., generally. The Middle Spotted Woodpecker (*D. medius*) was once observed in the neighbourhood of Oltre il Colle (3961 ft.). The Lesser Spotted Woodpecker (*D. minor*) is not at all rare, and I have secured in former years a great many specimens for my collection. The Wryneck (*Iynx torquilla*, v. Becaförmig) is a common summer visitor; it does not breed above about 4900 or 5200 ft. The Cuckoo (*Cuculus canorus*, v. Cucù) is a pretty common species during summer; it nests according to its usual method, but it is not found generally above 3000 ft. The Roller (*Coracias garrula*) and the Bee-eater (*Merops apiaster*) are stragglers. The Hoopoe (*Upupa epops*) is a fairly abundant species, not breeding above 5200 ft.; I have found the nest at Mount Ortighera (5009 ft.), a few feet from the top. The Kingfisher (*Alcedo ispida*, v. Martin pescadör, Becapèss, Piombi) is abundant. The Nightjar (*Caprimulgus europæus*,

v. teta-àche) is a fairly abundant summer visitor; it nests also near S. Giovanni Bianco, at Pianca (2447 ft.), Ronco dei Gatti (2690 ft.), Scalvino (1495 ft.), &c. The Alpine Swift (*Cypselus melba*, v. Dardù de corna, Rondù de corna) is less frequent than the Swift (*C. apus*, v. Dardù, Rondù), and it is found up to about 6000 ft.; both are summer visitors and breeding. Amongst the *Hirundinidæ*, the Martin (*Chelidon urbica*, v. Dard), the Swallow (*Hirundo rustica*, v. Rondanina), and the Sand-Martin (*Cotile riparia*, v. Dard R. de ria) are summer visitors, fairly common, and breeding. The Crag-Martin (*Biblis rupestris*) is met with up to 6000 ft. on the Lakes Gemelli; it is fairly abundant, and sometimes it is seen also on flight during winter; I have a specimen caught at Acquacalda (1935 ft.) on January 2nd, 1892. The White-collared Flycatcher (*Ficedula collaris*) is very rare during spring, while the Pied Flycatcher (*F. atricapilla*) and the Spotted Flycatcher (*Muscicapa grisola*, v. Alètt, A griss) are common and breeding. The Waxwing (*Ampelis garrulus*, v. Ciarlù, Bec-frisù) is sometimes seen as a straggler, and is very rare. The Shrikes are fairly abundant; they are called *Gazeta grossa*, *picola*, &c. The Southern Grey Shrike is lacking, the Lesser Grey Shrike (*Lanius minor*) and Red-backed Shrike (*L. collurio*) being the commonest. Amongst the *Paridæ*, both species of *Regulus*—Firecrest and Goldcrest (v. Stelì, St. de montagna) are common and breeding in the evergreen forests; they descend lower in winter and during the cold weather. I had the Bearded Titmouse (*Panurus biarmicus*, v. Paisöla di barbiss) from S. Pellegrino (1082 ft.) on October 2nd, 1896; and the Penduline Titmouse from Campo Fiorito (4960 ft.) on April 20th, 1899; both are in my collection, but they are rare, as I am told. Irby's Long-tailed Titmouse and the White-headed Long-tailed Titmouse (*Acredula irbyi* and *A. caudata*, v. Cua longa, Scuasi) are common and breeding. Amongst the others, I may mention the Great Titmouse (*Parus major*, v. Paissöla), Coal Titmouse (*P. ater*, v. Ciuicì), Blue Titmouse (*P. cæruleus*, v. Moneghina), common and breeding species; the Marsh Titmouse (*P. palustris*) is unknown; the Crested Titmouse (*Lophophanes cristatus* v. Ciuicì col söff) is restricted very high in the evergreen woods, where it breeds; I had it from Mount Verrobbio (6453 ft.) in summer, and from Olmo al Brembo (1694 ft.) in

winter. The Nuthatch (*Sitta cæsia*, v. Pic çender) is abundant. The Wall Creeper (*Tichodroma muraria*, v. Barbèl, Beca corne, Becaràgn, Pic de corne) is a fairly abundant species; it breeds on the Cancervo and everywhere in the high districts, but not above 5200 ft. The two *Certhiæ* (Tree-Creeper, v. Rampegghì) are met with; *Certhia familiaris* seems to be the commoner. The Wren (*Troglodytes parvulus*, v. Reatì, Trentapìs) is common and resident; it breeds everywhere on the mountains. The Dipper (*Cinclus merula*, v. Merèll acqueröl) is met with wherever in the adapted localities; I have not seen the northern form called the Black-bellied Dipper (*C. melanogaster*), but I succeeded in finding the Dipper up to 4500 ft. above the sea. The Hedge-Sparrow (*Accentor modularis*, v. Matèla) is met with, and breeds everywhere; while the Alpine Accentor (*A. collaris* v. Materòt, Materàss) is fairly common, and breeding, from 4500 to 7600 ft.; I obtained specimens from Somnadello and Cancerbero; in winter it comes lower; it breeds on the tops of the shanties of shepherds. The Thrushes are represented by the Blackbird (*Merula nigra*, v. Merell), very common; the two forms of Ring Ouzel (*M. torquata* and *M. alpestris*, v. Merla montana) are frequent; Dr. Giacomelli told me that the northern form is commoner, but I doubt it; all three breed, and also the Song-Thrush (*Turdus musicus*, v. Durt), of which I have succeeded in having a nestling from the Passo del Branchino (5628 ft.). The Fieldfare (*T. pilaris*, v. Visc-ièra) is only a winter visitor, and a bird of passage, while the Mistle-Thrush (*T. viscivorus*, v. Dressa) is resident; while so far there are no proofs of the breeding of the Redwing (*T. iliacus* v. Sdurdì) in these highlands. I have no notice regarding the other rare species of Italian Thrushes, but certainly the Dusky-Thrush (*T. fuscatus*), and perhaps the Black-throated Thrush (*T. atrigularis*), must be met with as stragglers. I preserve in my collection an adult male of the former, which was caught at Breno, a few miles from Bergamo, and not very far from the beginning of the Brembana Valley.* The Rock-Thrush (*Monticola saxatilis*, v. Cueròss) is a common bird, summer visitor, and breeding. The Blue Rock-Thrush (*M. cyanus*) is particularly abundant in

* E. Arrigoni degli Oddi, "Il *Turdus fuscatus* nel Bergamasco" (Riv. Ital. Sc. Nat. xiii. No. 9, Siena, 1893).

rocky parts of Taleggio Valley at Vedeseta (2490 ft.), Salzana Valley, &c., but not above from 3000 to 3600 ft.; it is frequently kept in cages for its sweet song; it is called *Passara solitaria*. Amongst the *Saxicolæ*. we found both *Pratincola rubetra* (Whinchat, v. Morèt) and *P. rubicola* (Stonechat, v. Machét Ciùp-tèc), and the Wheatear (*Saxicola ænanthe*, v. Cul-bianc), all common and breeding everywhere, especially on the mountains. The Black-eared Chat (*S. aurita*) is less common than the Black-throated Wheatear (*S. stapazina*). The White-spotted Bluethroat (*Cyanecula wolff*, v. Moràt turchì) is fairly abundant, and we may meet with it in autumn and in winter till January; there is no evidence of a spring passage, but it must surely happen. The Red-spotted Bluethroat is rarer.

As resident birds, are found the Redstart (*Ruticilla phœnicurus*, v. Moratì, Cuaròssa), Black Redstart (*R. titys*, v. Moràt nigher, M. carbunèr), and Redbreast (*Erithacus rubecula*, v. Piciàl).

Afterwards I observed the Nightingale (*Luscinia vera*, v. Rossignöl), Garden Warbler (*Sylvia salicaria*, v. Becafìg), Blackcap (*S. atricapilla*), Barred Warbler (*S. nisoria*), Orphean Warbler (*S. orphæa*), Whitethroat (*S. cinerea*, v. Gazetina), and Lesser Whitethroat (*S. curruca*, v. Beca-mùre)—all summer visitors, and breeding. Dr. Giacomelli told me he succeeded in obtaining one specimen of the Northern Nightingale (*L. philomela*), which was caught at Camerata on October 1st, 1899; it was an adult male, though this was not a very strange occurrence, I only admit this species on his testimony. The Phylloscopi (v. Tuì, Tuinòt Tuinù) are common, comprising *Phylloscopus bonellii*. About Reed-Warblers we know very little, but I saw on the Gemelli Lakes (5971 ft.) a specimen of the Grasshopper-Warbler (*Locustella naevia*), and I heard along the Ambria, not very far from Zogno (1017 ft.), the Sedge-Warbler (*Calamodius schœnobænus*); both are now in my collection. Amongst the Wagtails I mention the White Wagtail (*Motacilla alba*, v. Baleróta), the Grey Wagtail (*M. sulphurea*, v. Balarina), the Blue-headed and Yellow Wagtails (*Budytes flavus* and *B. cinereocapillus*, v. Boarì), which are common and breeding species; perhaps the Grey-headed Yellow Wagtail (*B. borealis*); but I have no notice regarding the Black-headed Yellow Wagtail (*B. feldeggii*). The Tree-Pipit

(*Anthus trivialis*, v. Guina), Meadow-Pipit (*A. pratensis*, v. Sguissèta), and Water-Pipit (*A. spinoletta*, v. Sgussetù) are common, and breeding to 6000 ft., and I found them breeding at the Gemelli Lakes and on Mount Farno (7626 ft.). The Tawny Pipit (*A. campestris*) was found breeding at the top of Mount Pojeto (4144 ft.), but the eggs were too far hatched. Richard's Pipit (*A. richardi*) is exceedingly rare. Probably the Red-throated Pipit (*A. cervinus*) is confounded with *A. pratensis*; I have a specimen in my collection from Zogno, with the date May 25th, 1898. Amongst the Larks, I may mention the Sky-Lark (*Alauda arvensis*, v. Lodola, Calandrù), common to 3000 ft., and the Wood-Lark (*A. arborea*, v. Lodoli), the Crested-Lark (*Galerita cristata*, v. L. dal capöss); they breed and are abundant. The Shore-Lark (*Otocorys alpestris*) is of an irregular appearance. The Lapland Bunting (*Plectrophanes lapponicus*) is rare, and also of irregular appearance during frozen weather; while the Snow-Bunting (*Plectrophenax nivalis*) is not very rare, but is of irregular occurrence, especially in January, on the Cancerbero and other high mountains; it is called *Passera bianca* or *Ortolà d-la nif*, and its rarity depends on the years and on the cold. The Corn-Bunting (*Miliaria projer*), Yellow-Hammer (*Emberiza citrinella*, v. Pajarana), Cirl-Bunting (*E. cirrus*), Meadow-Bunting (*E. cia*), and Ortolan-Bunting (*E. hortulana*, v. Ortolà) are very common, and breeding; the first three are also resident. The Rustic and the Little Bunting (*E. rustica* and *E. pusilla*) are rare. The Reed-Bunting is common, and less so the Large-billed Bunting, though only as birds of passage. Amongst the *Fringillinæ*, the Italian Sparrow (*Passer italiae*, v. Passer gross, Passarù), and the Tree-Sparrow *P. montanus*, v. *Passera büseröla*) are common, but not above about 4600 ft., where they are replaced by the Alpine Accentors, found on the roofs of huts. The Rock-Sparrow (*P. petronia*, *Passera d' montagna*) is fairly abundant. Regarding the Snow-Finch (*Montifringilla nivalis*), the information is not satisfactory. People say it is a straggler, and of irregular passage in winter; but I do not think so. I believe these birds are resident at about 6000 ft. in height, and that during the cold weather they descend lower. I obtained some from Foppolo in the winter of 1888, for which I am indebted to Count Roncalli, from Bergamo. After-

wards it was seen, during winter, at S. Giovanni Bianco, Cancero, Camerata (Giacomelli's *fides*). I have noticed that it is met with on the Pizzo dei Tre Signori, Cima di Piazzo (6268 ft.), Mount Aralalta, and Mount Venturosa (6091 ft.). They nest on the roofs of huts, sometimes in the crevices of cliffs, and in the daytime they remain very long at the top of rocks quite close to each other, and we could approach very near them, but at the first report of a fowling-piece they were intensely alarmed, and it was quite impossible to enter into friendly terms with them again. The Hawfinch (*Coccothraustes vulgaris*, v. Frisù), Chaffinch (*Fringilla cœlebs*, v. Frànguel), Brambling (*F. montifringilla*), Greenfinch (*Ligurinus chloris*, v. Amaròt), Siskin (*Chrysomitris spinus*, v. Logarì), Goldfinch (*Carduelis elegans*, v. Gardelì, Raarì), Serin (*Serinus hortulanus*, v. Sverzerì), Linnet and Bullfinch are common and resident, but much more abundant in passage-time. The Northern Bullfinch (or *Pyrrhula major*), is also met with; I preserve in my collection a splendid adult male, which I procured from Piazzolo (2139 ft.), through the kindness of Sign. A. Oldrighetti. I have not seen hybrids between *F. cœlebs* and *F. montifringilla*, but Dr. Giacomelli told me that they sometimes interbreed; that almost every year he has seen some of them; and that they are well known to bird-catchers. The Citril-Finch (*Chloroptila citrinella*, v. Turlurì, Canarì de montagna) does not breed, and seems to be only a passage-bird, and not very abundant in most years; it passes generally in the first fortnight of October; and if in one year it is fairly common, in another it is almost rare, so that the flight is not always of the same intensity. I obtained specimens for my collection from Serina (2508 ft.) and Olmo at Brembo. I have made many enquiries in order to learn if this species breeds or not, but have never succeeded in ascertaining; I think, however, that this operation certainly occurs in the evergreen woods of the highest mountains.

Redpolls (*Ægiothus linaria* and *Æ. rufescens*, v. Gegì, Cardinalì) are tolerably abundant during the passages, but whether they breed in these mountains is uncertain. Of the Pine-Grosbeak (*Pinicola enucleator*), a straggler was caught in the "Roccolo" of the Trinità near Dossena. The Parrot Crossbill (*Loxia pityopsittacus*) is certainly very rare; but, regarding this species, Dr. Giacomelli told me it is of an irregular passage, and

he observed it during 1897 and 1899 at the "Roccolo" of Dossena. Last year, at the end of October, he received five young specimens, which, according to him, undoubtedly belonged to that species. The Common Crossbill (*Loxia curvirostra*) is resident and fairly abundant; it certainly breeds in the woods near Piazzolo, according to the information of Dr. Giacomelli, who has succeeded in finding nests several times. They were placed upon the horizontal branches of some firs, from six to eight feet from the trunk; sometimes they were built on the top of the firs. The Two-barred Crossbill (*Loxia bifasciata*) is very rare, and certainly a straggler; a specimen was caught at the Dossena "Roccolo" two years ago; it was unfortunately eaten (Dr. Giacomelli's *fides*). The Common Starling (*Sturnus vulgaris*, v. Stornèll) is principally a passage-bird in these highlands, but some couples remain during summer, and breed generally on the trees. The Golden Oriole (*Oriolus galbula*, v. Galbèr) is tolerably common during summer, and breeding also near S. Giovanni Bianco. I found several of them towards Brembilla (1274 ft.) in the Brembilla Valley.

Amongst the *Corvidæ*, the Alpine Chough (*Pyrrhocorax alpinus*, v. Tàcola dal bec zald) is common; it does not live so high as the Red-billed Chough (*P. graculus*), but, like the latter, it nests and is resident. The latter (v. Tàcola dal bec ross) is fairly common, but a widely localized resident, and breeding along all the Orobie watershed on Mount Redorta (9154 ft.), Mount Gleno (8785 ft.), Mount Venerecolo (7889 ft.), Pizzo Tornello (8190 ft.), and sometimes, but not often, at the Cà S. Marco (5582 ft.). They descend a little during winter. The presence of this species in that province is not very extraordinary, but authors seem always ignorant of the fact, though I can vouch for it, as I had a nice adult male caught at Mount Cavallo (7101 ft.) on Sept. 3rd, 1893; this is preserved in my collection. We found the Carrion-Crow (*Corvus corone*) uncommon, but the Rook (*C. frugilegus*) and the Hooded Crow (*C. cornix*) common; they breed, and I found many of them feeding in a meadow, on Aug. 20th last year, at the Corno Grosso (4025 ft.) near Piazza Brembana. The Raven (*C. corax*) is tolerably abundant on the highest mountains, from which it descends in winter time; and the Jackdaw (*C. monedula*) is very

common. Both are resident and breeding. The Jay (*Garrulus glandarius*) and the Magpie are common and resident, and so is the Nutcracker (*Nucifraga caryocatactes*), which is perhaps not very abundant, and which lives particularly in the thickest woods.

The Turtle-Dove (*Turtur communis*) is a summer visitor, but not very frequent; it breeds. The same may be said about the Wild Pigeons which are sometimes met with during the passages, but they are somewhat scarce, and I do not know whether they breed or not.

Pallas's Sand Grouse (*Syrrhaptes paradoxus*) seems to have appeared once in the last incursion of 1888; this information was given me by Dr. Giacomelli. The Common Ptarmigan (*Lagopus mutus*, v. Roncàs) and the Black Grouse (*Tetrao tetrix*) are fairly common, resident, and breeding on the highest mountains, as Cancerbero Aralalta, Cà S. Marco, &c. The former is sold in the market for about four shillings each, the latter for twenty shillings a couple, if they are male and female, and less if they are not. The Hazel Grouse (*Bonasa betulina*, v. Francoli) and the Capercaille (*Urogallus vulgaris*) seem to have disappeared from Brembana Valley; the former is now only seldom met in the mountains of the Seriana Valley, where it confines with Cavallina; the latter in those of the Valley of Scalve; but they are uncommon birds, perhaps almost extinct. All these gallinaceous birds are greatly persecuted by birdcatchers, in every way and at all seasons, so they decrease perceptibly every year. The Quail (*Coturnix communis*) is not a common bird in the Brembana Valley, strictly speaking, but it is met with and sometimes breeds in the lower parts of it, in corn-fields or meadows of trefoil (Dr. Giacomelli). Fairly common, however, are Partridges (*Perdix cinerea*, v. Pernis), and especially Greek Partridges (*Caccabis saxatilis*, v. Coturna). The latter is found in many places—Cancerbero, Somnadello, Castello Regina (1424 ft.), Cà S. Marco, &c. To give an idea of its frequency, I may mention that Sign. Pianeti, from Camerata Cornello, a most celebrated hunter and shooter, kills from one hundred to one hundred and thirty of them every year in two months' shooting. They cost, on the market, from eighteenpence to two shillings each, according to the weight; very old specimens weigh about two pounds,

and they are greatly sought for their excellent flesh. Partridges commonly cost about eighteenpence each. Both breed everywhere on the mountains. Dr. Giacomelli assures me that the Red-legged Partridge (*C. rufa*) is also found in the province, sometimes in the Brembana Valley, but especially in the Valley of Scalve on the highest mountains. I have not succeeded so far in getting any specimen of this species, which is on the way of becoming extinct in many parts of Italy; in Tuscany and in the Elba Island it also becomes every year more and more rare.

Grallatores and *Anseres*, in the Brembana Valley properly called, are almost absent, or irregular and straggler visitors; but I have noticed the following:—Lapwing (*Vanellus capella*); Golden Plover (*Charadrius pluvialis*, v. Co-dùr, Piviè), of which I have a specimen from Ponte Enna (1837 ft.), April 1st, 1890; and I am sure that the Dotterel (*Eudromias morinellus*) must appear on the high meadows; the Broad-billed Sandpiper (*Limicola platyrhyncha*) appeared once on the Brembo River close to S. Giovanni Bianco on Aug. 27th last year; Dr. Giacomelli has preserved the rare specimen, but, alas! in a pitiful state of preservation; the Common Redshank (*Totanus calidris*, v. Culètt) is uncommon; in my collection there is a specimen from Costa dei Lupi (1867 ft.); it was caught starving on April 4th, 1900; the Greenshank (*T. glottis*, v. Sgambetù) is rarer than the latter, but I had a specimen killed along the Brembo on May 2nd, 1896; it is also in my collection; the Common Heron (*Ardea cinerea*); Purple Heron (*A. purpurea*), and Squacco Heron (*Ardeola ralloides*) are seen sometimes during spring; the Woodcock (*Scolopax rusticola*) is a fairly common bird during the passages and in winter; it seems to have bred once near Fuipiano al Brembo (1411 ft.); the Common Snipe (*Gallinago caelestis*) is sometimes seen along the Brembo, and so is the Double Snipe (*G. major*) and the Jack-Snipe (*G. gallinula*), as I have been told. During stormy winter weather the Common Gull (*Larus canus*) and the Black-headed Gull (*L. ridibundus*, v. Gabià) were seen along the Brembo; and regarding the Great Crested Grebe, Dr. Giacomelli assures me that a specimen was caught at the Ponte dei Frati (1207 ft.), near S. Giovanni Bianco, in the winter of 1898; and, finally, amongst the Wild Ducks we can mention Mallard, Wigeon, Teal, and Garganey, all of them irregular visitors.

There is no doubt that many other species of these birds must or may appear during the flights, but only naturalists who are accustomed to live in that neighbourhood can make a complete list. That, however, in our case is not very important, because it is rather difficult to find a very rare water or shore bird in those districts, though we may easily meet other species, as Dunlins, Sandpipers, Water-Rails, Crakes, Coots, Gulls, Terns, Grebes, &c., which are not uncommon in the neighbouring open plain, where they can live at their ease. As these places are not adapted for them, they may appear here only as stragglers, or in the flight-time as irregular ones; but this fact seems to me of very little interest, for I firmly believe it exceedingly difficult to find Sociable Lapwings, Phalaropes, Purple Sandpipers, Bartram's Sandpipers, Bernicle Geese, Scoters, and Skuas here, or the many other birds of rare appearance in our subregion, which offer a particular interest to the Italian ornithologists.

THE NESTING HABITS OF MOOR-HENS (*GALLINULA CHLOROPUS*).

BY OLIVER G. PIKE.

DURING some years past there has been much discussion in 'The Zoologist' concerning the nesting habits of Moor-hens. Opinion among some ornithologists still seems to be divided as to whether these birds cover their eggs on leaving their nests. During four years I have had several pairs of Moor-hens under observation; and in the case of dozens of nests I have never seen the eggs covered. During the spring of 1900 I found a nest carefully domed over with reeds, almost perfectly hiding the contents from any egg-stealing bird that might pass over; but, with this one exception, I have never known of a Moor-hen trying to conceal her eggs.

It is not with this question, however, that I would particularly deal, but rather with an overlooked habit of this species.

On July 3rd, 1899, I roused a Moor-hen from her nest, which contained no eggs; and, thinking perhaps that the eggs might be covered, I carefully examined it. There were some flat reed-blades which had the appearance of being recently placed there, but there were no eggs underneath. A little farther up stream I found another nest built in a very exposed situation, but still containing no eggs. The next day I visited the nest first mentioned; I cautiously approached, and again saw the hen sitting, her head being tucked under one wing. She was probably asleep, but on my making a noise she instantly sat up and then jumped off the nest, when I was surprised to see three nearly full-grown young birds emerge from beneath her. The nest was an exceptionally large one, and the bird when sitting seemed to be larger than usual, the three young which she was covering of course accounting for her apparent large dimensions. About six feet from the first nest another had been commenced, but this was smaller than the other. I waited for some time, hoping

the birds might return, but they did not do so. I then returned to the nest farther up stream, when I had the satisfaction of seeing one of the old birds sitting; she left the nest on my approach, but it contained neither eggs nor young. The following evening this bird was again sitting; the nest now contained one newly-hatched Moor-hen, and both this and its parent scuttled away on seeing me. In the nests first found three young birds were in possession and were all asleep, one of them being in the new nest, which was now completed.

On July 7th I again visited these two nests, but a number of people near had frightened the birds, and they were not to be seen. A curious thing, however, was that another nest, similar to the second one, had been built, the three forming a kind of triangle. After this the birds were constantly seen to leave these nests when I approached. On the same day I went to the nest which on July 5th had contained one young bird. The little black Moor-hen was still there, and its parent had left before I arrived. I heard her on the other side of the stream, however, calling to the young bird to follow, which it did with characteristic alacrity. This nest had had much material added since I last saw it, and was consequently rather high above water; it was chiefly composed of fine dry grasses. On the two following evenings the nest became visibly smaller, and careful observation proved that the Moor-hens were moving it piece by piece to the other side of the stream, where the situation was more sheltered. The nest in which the young were hatched was a few yards from this roosting-nest, being built in a bush about ten feet above water-level. I watched the Moor-hens very closely to see whether they would make another nest when the young were hatched, with the result as described. The other three roosting-nests, built close together, were about twenty-five yards from the one which was used for incubation purposes.

In the spring of 1898 a nest was built beneath the roots of a tree on the stream-side; it contained eight eggs, and incubation lasted three weeks. Immediately the young were hatched a sleeping-nest was made about three yards from the first, in the middle of the stream, supported by a submerged tree. The original was afterwards deserted, and this one alone used. As the young grew, however, another was built, evidently because

the other was too small to hold the growing family. The same year I found another nest under a tree-root three hundred yards from the one just mentioned. When the young were hatched, another was made in a more exposed situation. On April 27th, 1900, I discovered a Moor-hen's nest by the side of a stream. On May 7th some of the young were hatched, and a roosting-nest was commenced—probably by the male bird—in the centre of the stream, this one also being supported by a fallen tree. For several evenings afterwards one of the adult birds was sitting in this latter with the young, and once or twice I was able to approach by day to see one or two young birds using it. As the latter grew, another nest was built under the roots of a neighbouring tree, this being a large, loose, clumsy structure, such as might have been built by the young themselves.

Near the stream-bank were a number of trees, and at the top of one of these I waited for several hours to observe more closely the habits of the Moor-hens. I had not waited long before the hen swam up stream, meanwhile calling her brood together; she entered the nest built in the stream, and turned round several times to smooth down the loose grass just recently placed there. I could hear the young birds, but could not see them on account of the foliage in the tree. At this moment the keen eye of the old bird caught sight of me; she hastily left the nest, and did not return.

This nest was of immense size, and was constantly being added to; I found freshly added green grass as late as the beginning of August. Another nest that I had under observation during this year (1900) was a repetition of those previously described; roosting-nests were added for the young in a similar way.

Although I have consulted several works for the purpose of learning something about such extra nests, they do not appear to be mentioned in any of the chief reference books. Mr. G. B. Corbin, writing in '*The Zoologist*' for Feb. 1899, p. 82, says:—"With regard to the nidification of the Moor-hen, I have often found that a much larger number of nests seem to be constructed than are ever used; but for what purpose is this apparent waste of time and labour?" This is the only reference I have found relating to what I call Moor-hens' roosting-nests.

It seems to me that all Moor-hens build these extra nests for

the purpose of providing resting-places for their young; I also think that the young, when sufficiently grown, make additional ones for themselves. I should like to hear from any correspondents who have observed this hitherto overlooked habit of one of our most interesting water-birds.

There is one other habit I may mention. In all of the Moorhens' nests I have found, it seems to be a general rule for the hen to commence sitting as soon as the first egg is laid, so that some of the young are hatched before others. Probably the male bird commences an extra nest for these first-comers to use; for one additional nest under my notice was commenced before the hen had finished sitting.

LOWESTOFT FISH-WHARF.

BY THOMAS SOUTHWELL, F.Z.S.

DURING a visit to Lowestoft extending from the 3rd to the 24th of October, I paid almost daily visits to the fish-wharves, where the arrivals of fish are landed and disposed of by auction, the great bulk being at once packed and transferred to the railway-siding to be despatched to the various markets in London and elsewhere. There are two docks, each very extensive, and furnished with a landing-stage, covered in and paved, that devoted to trawl-fish being 500 ft., the other, 650 ft. long, to Herring and Mackerel brought in by the drift-netters. On the floors are deposited the Herring and Mackerel in great heaps, consisting of ascertained quantities, and these are sold by duly authorised persons to the highest bidder. The scene when the fish are being landed in large numbers may be easily imagined: the ringing of the auctioneers' bells; the shouts of "Mackerel buyers," "Herring buyers," or as the case may be; the crowding by rough men in a vast variety of costumes, from the great sea-boots and oileys to the serge-clad salesmen, some wearing an outer coat of linen to protect their clothes, and rubber boots or huge "clogs" to guard their feet: but all is picturesque in the extreme. The heaps of glittering Herring or beautifully iridescent Mackerel look like bright gems in the sun, and the bustle, great as it is, is in a manner orderly and perfectly good-natured, jokes and rough witticisms flying about in plenty; a stranger, however, soon finds himself in the way, and feels that he has no business there, if he is not present on business.

The wharf for trawl-fish is often an even busier scene, as there is a greater diversity of fish and more buyers, and many of them of a different class to those who frequent the Herring wharf, where, as a rule, the merchants and curers are the purchasers. The trawl-fish are landed in boxes called "trunks,"

and many a retailer will buy one or more trunks of fish for his business requirements ; but the mode of disposal is the same. The auctioneer, preceded by a man ringing a bell, mounts upon one of the fish-trunks, and shouts his ware : " Now, then, But buyers," " Roker buyers," " Lachet buyers," or as the case may be. The buyers crowd round, and amid jocular remarks, in which the seller does his part, trunk after trunk, piled with Turbot, Brill, Whiting, Plaice, Soles, Skate, and a dozen other kinds, are rapidly disposed of, whilst others are being as rapidly landed from fresh arrivals to take their place.

It is the wharf for trawl-fish which is the most attractive to the student of fishes, and I scarcely ever went there but I saw something of special interest. There were always vast quantities of flat-fish of various kinds, from costly Turbot, some very large, and almost equally costly Soles, to humble Plaice and Dabs ; but the infinite variety in the tints and disposal of the colours and markings was very interesting. I am told that the salesmen are so experienced that they can tell at once by the appearance of the fish from what locality they were derived. Large numbers of Skate and Rays were there, from baby fish which figured among the refuse, to monsters, hideous in appearance. Laid by itself, as a " curiosity," on one occasion, I saw a fine Torpedo Ray (*Torpedo nobiliana*), which is a very rare fish with us. *Raia batis* was common enough, but I also saw two specimens of *Raia oxyrhincus*, a rare fish here.

On the 20th a fine Porbeagle was brought in, which measured 7 ft. 10 in. long ; this species, much to the annoyance of the fishermen, is occasionally entangled in the drift-nets, to which and the contained fish it does immense damage. Large numbers of the Mackerel and Herring show injuries inflicted by the various species of Dog-fish, but I saw very few of these pests landed ; perhaps the fishermen kill them, and throw them back into the seas, as they are of no use to them.

A Porpoise made its appearance one morning ; they are abundant enough ; but I have never, to my surprise, seen or heard of a Dolphin (*Delphinus delphis*) being captured by any of our boats. This is singular, as Sir Thomas Browne knew this species, and there seems no reason why it should not occasionally pay us a visit.

On the 18th there was a fine (broad-nosed) Sturgeon brought in, which I was told sold for £5 ; it excited more interest than the Porbeagle. Garfish was of daily occurrence, and Allis Shad (*Clupea alosa*), a few. Mackerel there were, of course, in immense numbers, but it is remarkable how little variation there was in colour and marking. This fishery, which formerly on our coast was confined to the spring, has now become quite an autumn industry, and vies with the Herring fishery.

On the 24th I saw a very handsome Three-bearded Rockling (*Motella tricirrata*), which the fisherman appropriately called a "Leopard-ling" ; it was fifteen inches in length, and beautifully coloured. The Dory (*Zeus faber*) was of almost daily occurrence ; sometimes as many as a dozen or more could be counted, but they were generally small. The same may be said of the Surmullet, which always appeared in more or less numbers.

There were many other fish which, not being highly esteemed, found their way into the refuse-heaps, and sold for very small sums. Among them were large numbers of Weaver-fish, and small Gurnards of various kinds ; but the large *Trigla hirundo*, known here as the "Lachet," of which there was always a good supply, many of them measuring 22 in. to 24 in. long, were great favourites, and sold well.

Lobsters and Crabs were not numerous, but some of them very fine, as also dredged Oysters of very ancient appearance, whose shells must have formed the homes of vast colonies of Zoophytes and the lower forms of marine animals ; but there was one crustacean which surprised me with its numbers, having hitherto regarded it as of very unusual occurrence on the Norfolk coast. These were often large baskets of *Nephrops norvegicus*, which the fishermen called "Prawns." I had never seen this species in such quantities before, and upon inquiry was told that it came from the "North Sea," a very wide address ; but the fishermen have their favourite haunts, and do not care to speak too precisely to strangers. I, however, learned that they were brought by the trawlers from the "Dutch side"—that is, somewhere about the Texel, and from thence to Heligoland—and this Mr. Patterson confirms from Yarmouth.

Of course it would not be right to claim the fish we see landed here as belonging to our immediate neighbourhood. The

steam trawlers go far afield, and their produce may have been acquired a long distance from home ; but there are others which make their captures nearer home, and, by the exercise of due caution, a shrewd guess may be formed, and often accurate information obtained as to the locality of their origin.

My object in writing is to show how very interesting to an ichthyologist such a place as the Lowestoft fish-wharf is, and to express my regret that there is now, to my knowledge, nobody living there who takes an interest in the subject. Were such the case, I am convinced that in a few years we should have a much more accurate knowledge of the fish-fauna of the seas washing our shore than we have at present.

A PLAGUE OF SNAKES.

BY GERALD LEIGHTON, M.B.

THAT a dwelling-house in this country should be visited with a plague of Snakes seems like a wild romance, and no doubt very many readers of the daily papers who perused the following paragraph (or a similar one) gave the reporter credit for a somewhat lively imagination :—

“A PLAGUE OF SNAKES. — The residents of a house at Cefncaeau, near Llanelly, are suffering from a plague of Snakes. The reptiles are of all sizes and colours, and they crawl over the floors, infest the cupboards, curl themselves together on the furniture, and even luxuriate in the bedrooms. No fewer than twenty-two Snakes were slaughtered in one day.”

The above is from the ‘Morning Leader.’ The Cardiff ‘Western Mail’ went into more detail still, and reported the occurrence thus :—

“A PLAGUE OF SNAKES AT LLANELLY: HOUSE COMPLETELY INFESTED.—The residents of a house at Cefncaeau, near Llanelly, have undergone a very unpleasant experience of late. It was reported by the sanitary inspector of the borough council on Friday that the place had become the domicile for innumerable Snakes of all sizes and colours. They crawled over the floors, infested the cupboards, curled themselves together on the furniture, while some more aspiring members of the species climbed the stairs and luxuriated in the comforts of the bedrooms. The human occupants of the house had done their best to rid themselves of these unwelcome visitors, and had waged a war of extermination against them. The Snakes continued to come, however, although, as the inspector explained, no fewer than twenty-two were slaughtered in one day. The sanitary committee listened to the recital of these facts with horror written on their faces, but took no action in the matter, being uncertain, probably, whether their jurisdiction extended to Snakes. How-

ever, the inspector will probably serve notice to quit upon them, failing compliance with which more summary measures will be taken."

This was about the second week in September, 1900, and most of the daily papers had some reference to the curious phenomenon. It seemed to me that it would be interesting to investigate the matter thoroughly, and accordingly I communicated with the sanitary inspector of Llanelly, to whom I am indebted for the facts here related.

It seems, then, that the house in question is one of a row of eighteen, and faces the north. The gardens are in front of the houses, with *a road between*. At the back of the row there is a stubble-field, the level of which is a little higher than the floor of the houses. There are no back doors on to this field, each house having a small back window, some of which are made to open, others not. Below these houses the locality is very wet and damp, and there are several small old coal-pits, over a hundred years old. For the last six or seven years there have been scores of Snakes to be seen about these houses, even climbing up the walls, and on to the old-fashioned roofs which they have. For the last two or three years the reptiles seem to have become even more numerous. In the particular house (No. 2) referred to in the above quoted paragraphs, the woman who lived in it one day saw a small Snake on the hearthstones, right before the fire. The next day she saw several dropping down from *a hole in the wall* about two feet from the floor. They then made a search, and found a dozen more, and again, in another place, several small ones. The tenant then made out that the place was unhealthy, and left, having first of all reported this extraordinary condition of affairs. On Oct. 28th the sanitary inspector was looking over some repairs to this particular house. The back wall was taken down and the oven, but nothing was found there. However, on removing the rubbish, he saw a small Snake, and captured it. Such are authentic facts of the matter given to me by Mr. D. P. Thomas (sanitary inspector).

Of course, the two interesting questions were, first, which of our Snakes was it that was thus obtruding itself in such numbers; and, secondly, where did they come from, and how? There could be little room for doubt as regards the first; the mere fact

of the reptiles being in such numbers made it most probable that the Common Ring-Snake (or Grass-Snake) was the intruder. However, to set the matter beyond all doubt, I requested Mr. Thomas to send me the specimen he caught for identification. This he kindly did, and it turned out to be, as I expected, *Tropidonotus natrix* (the Ring-Snake). It measured $7\frac{1}{4}$ in. in length, and was a young one, probably hatched out about the middle of August. As there was no suggestion that more than one kind of Snake participated in the visitation, this settled that point. The next question is—where did they come from? If one thinks for a moment of the natural habits of this our Common Snake, it is not difficult to see how it could easily happen that a large number might suddenly make their appearance. The Grass-Snake is oviparous, depositing its eggs, sometimes to the number of three dozen or more, in any convenient rubbish-heap, or manure, there leaving them to the action of the sun and moisture to be hatched out. They are deposited in the spring, and hatch out either in the autumn, or, as not infrequently happens, remaining over the winter unhatched, and developing only the following spring. In this case they evidently hatched in the autumn, early in September.

Probably the haunt of the parents at Llanelly is in the old quarry referred to. A bunch of eggs could very easily be carried into the house in some faggots, and there lie unheeded till hatched out, and then suddenly a "plague of Snakes" appears. From the fact that as many as twenty-two were taken in the one dwelling, this seems to have been the case, as it is unlikely that so many would have made their way into one house, unless born in it. Moreover, I am informed that all were about the same size, which further points to their origin being from one bunch of eggs. It is quite possible that the eggs were deposited by the parent behind the oven, or in a hole in the back wall, and there lay undisturbed during the period of development.

On taking down a further portion of the wall, no fewer than forty bundles of eggs were found, each bundle containing thirty eggs, out of each of which a young Ring-Snake was issuing; so that there were some twelve hundred of the reptiles in an area of a few feet (*cf.* letter to 'The Outlook,' vol. vi. p. 526).

NOTES AND QUERIES.

MAMMALIA.

CETACEA.

Lesser Rorqual Whale.—An adult female example of the Lesser Rorqual (*Balanoptera rostrata*) was washed ashore two miles north of Caister (five miles north of Yarmouth) early on the morning of Dec. 3rd last. I went to see it in the noon-hour, and found the dimensions as follow:—Length, 30 ft.; width of tail-fluke, 7 ft. 6 in.; pectoral flippers, 4 ft. It had evidently followed the Herring-shoals, and, getting into difficulties amongst the sand-banks, had succumbed. It had been dead five or six days, and was already becoming very “high and gamey.” The deeply furrowed belly had expanded with putrefactive gases, and answered to pressure like a huge bladder. No traces of having been run into by steamer or other craft were visible, but the outer skin had been much abraded from contact with the sands. Someone had been before me, and had cut out all the baleen but a seven-inch length near the snout. This example is identical in size with the one that afforded such an exciting chase in Yarmouth Harbour in June, 1892, and which the writer exhibited, stuffed, on the marine parade in the following season.—ARTHUR PATTERSON (Ibis House, Great Yarmouth).

AVES.

Habits of the Ring-Ouzel.—Referring to Mr. Fox's interesting article in ‘The Zoologist’ (1900, p. 1), on the Ring-Ouzel (*Turdus torquatus*) in Derbyshire, it will be seen that Lord Lilford says, “I have observed the bird in our immediate neighbourhood, on its return migration, about the end of April”; and the Rev. H. A. Macpherson (‘Fauna of Lakeland,’ p. 89) writes, “The last days of March witness the return of the Ring-Ouzels to their upland home.” From what is known of its migratory habits, one would think that this species should arrive in Northamptonshire much before the end of April; but if the date of arrival is fixed late for Northamptonshire, Mr. Macpherson's date for Lakeland would appear to be early. Of course they may arrive in the Lake District earlier than here, but this seems hardly probable. We have seen it here in March, but this has been in an exceptionally mild season, and in normal seasons it cannot be expected to arrive before the first week in April. In its general

habits we quite agree with St. John ('Sport in Moray,' p. 103) and Macgillivray ('British Birds,' vol. ii. p. 102), that they are similar to the Blackbird, more so than between those of the Fieldfare and Song-Thrush, as stated by Mr. Fox. On the other hand, we quite agree with Mr. Fox that the Ring-Ouzel does not manifest any skulking habits during the breeding season—at least when it has young—at which time it is often bold and fearless, and advances to within a short distance of any intruder who may be playing with its young. Contrary to Mr. Fox's experience, we have never found the male bird to take part in incubation. They appear to be fond of berries (*Vaccinium* and *Empetrum*), and in autumn, just before migration, may be seen feeding upon elder-berries. When flushed from the nest, we have never seen them "reel and tumble on the ground to decoy one away," as Seebohm states ('British Birds,' vol. i. p. 248), but have seen them, when flushed from hard-sat eggs, or when having young, flutter for a few yards in a lazy sort of fashion over the top of the heather. Regarding the date of nesting, Mr. Fox mentions one which he found (April 29th) as ten days or a fortnight earlier than he usually sees them; but this date we should not regard as at all being early. They commence nidification very soon after their arrival, much more so than most of our summer visitants. In this district it much prefers to build its nest where the ground is much broken up, more so than on the flat portions of the moorland; a "gully" or steep declivity seems to be a particularly favourable nesting site, and I have, like Mr. Fox, found it breeding occasionally at some distance from the moors; and have also found its nest built in trees, but never at any great height. The eggs vary, even in the same nest, and it not unfrequently happens that, whilst three or four are of the typical colour and markings, one is hardly to be discriminated from the egg of a Blackbird. Four is the usual number of eggs, sometimes five, but we have never known it to sit upon three.—E. P. BUTTERFIELD (Wilsden, Yorkshire).

Occurrence of the Willow-Tit in Sussex.—In this Journal (1898, pp. 116–118) Mr. Ernst Hartert announced the discovery in England of the *Parus salicarius* of C. L. Brehm. The paper did not receive the attention it merited, probably because of a feeling of uncertainty among British ornithologists as to the validity of the species. During August, 1900, I determined to get together a series of Marsh-Tits, in the hope of procuring skins answering to the description of *P. salicarius*. It seemed to me that it would be best at first to search regularly each day the woods close at hand. By the 12th of October I had a fair series of Tits, and on that day I picked out three skins which I judged to be nearest to the Willow-Tit, and submitted them to Mr. Hartert, who replied that they were doubtless assignable to *Parus salicarius*. I have since shot three other examples, the last being a fine adult male, which I obtained on the 2nd of

December in Pond Wood, close to St. Leonards. When once the characters of the Willow-Tit are known, it may be distinguished without difficulty from the Marsh-Tit (*P. communis dresseri*) chiefly by its smaller size, the duller crown and nape, the more rufous flanks, and by the two outer rectrices being relatively shorter than in the latter. In the paper referred to, Mr. Hartert expressed the opinion that "British specimens of *P. salicarius* . . . differ a little from continental ones in being somewhat darker above, and having shorter wings." These and other differences exist, and have led Herr C. E. Hellmayr, in a recent paper,* to separate the British form as *Parus montanus kleinschmidti*. In the opinion of the present writer this is the name by which the British Willow-Tit should be known. I have not ventured to make any remarks about the habits of the bird, as I hope to make these the subject of a future note. — W. RUSKIN BUTTERFIELD (4, Stanhope Place, St. Leonards-on-Sea).

House-Martins in November.—On Sunday (Nov. 25th last), at Margate, I watched for some time four or five House-Martins (*Chelidon urbica*) flying about near the Cliftonville band-stand. — HENRY T. MENNELL (Croydon).

Hybrid Crow and White Wagtail in Merioneth.—It is with pleasure that I am able to record a specimen of an intermediate form between *Corvus corone* and *C. cornix* as having been taken in the county of Merioneth. The bird in question was shot near Barmouth some five years ago by Mr. F. C. Rawlings, of that town, and has since been purchased by the writer, and most carefully compared with the true *C. cornix*. Although the two Crows are well known to interbreed, as may be seen in the beautiful case shown in the Cromwell Road Museum at South Kensington, the results of such crosses are sufficiently rare—at any rate, in North Wales—to warrant special mention in 'The Zoologist.' In appearance at first sight largely resembling a "Grey Crow," a closer examination shows that the head is of a blackish brown colour; the mantle brownish grey, not clear grey. Below the black throat, and to the middle of the breast, grey preponderates, as in a pure-bred *C. cornix*, but is of a darker shade. The entire abdominal region and under tail-coverts are brownish black. The bird in question is hardly as large as some specimens we have handled of typical *C. cornix*. Whilst writing, it may be of interest to mention that a mature White

* "Einige Bemerkungen über die Graumeisen" (Ornithol. Jahrb. xi. pp. 201–217). The following is a translation of the original description of *P. m. kleinschmidti*:—Nearest to *P. mont. salicarius*, but the back more intensely coloured dark rust-brown. Secondaries with wide rust-brown margins. The creamy tinge of the sides of the neck extends to the base of the bill, and surrounds also the chin-spot from in front [*i.e.* from below], and laterally. Sides of the neck creamy yellow. Under side intensely rusty.

Wagtail (*Motacilla alba*) was seen at close quarters by the writer on Barmouth Bridge during October last.—J. BACKHOUSE (Harrogate).

Nesting of Long-eared Owl.—On May 3rd a nest of the Long-eared Owl (*Asio otus*) was found on the ground under a tiny Scotch fir amongst the heather on the peat-moss here. It contained two eggs. The nest was not visited again till May 16th, when the eggs had disappeared. On the 19th, however, a second nest was discovered about a hundred yards from the first, and in an exactly similar position. It contained four eggs, from which three young birds were subsequently hatched. To make certain of the species one of the young Owls was kept. It is a beautiful bird, and has a fine appetite. One night five mice and a young rat were put in the aviary in which it was kept; next morning they had all disappeared. I think the fact that both nests were on the ground, though there was an abundance of trees close at hand, is worth recording. Mr. J. H. Gurney mentions a similar instance in 'The Zoologist' (1900, p. 103), and a case is recorded by Stevenson ('Birds of Norfolk'). — CHARLES F. ARCHIBALD (Rusland Hall, Ulverston).

"The Mode of Progression of the Phalacrocoracidæ underWater."
—In confirmation of Mr. Meiklejohn's remarks on this subject (Zool. 1900, p. 557), I may say that some years ago, on a very bright sunny day, I was standing on a cliff about thirty feet high, looking down upon a perfectly smooth and glassy sea on the coast of Skye, and saw immediately below me a Shag fishing. He was hunting round and under every stone, as a terrier would for a Rat, and never once used his wings.—J. P. JOHNSON (Castlesteads, Brampton, Cumberland).

Early Jack-Snipe (*Gallinago gallinula*).—Will Mr. J. Whitaker kindly say *where* he twice flushed one of these little birds on August 28th last? (Zool. 1900, p. 557). My experience teaches me that the species does not immediately resort to the marshes on first arriving in England; or, let me rather say, the pioneers of the impending migratory movement, when flushed by me in Leicestershire, are never in marshy tracts, which I invariably beat in September, but are always started from dry out-of-the-way spots where one would least expect to find them. I understand that Mr. A. H. Meiklejohn has met with some experience that tallies with my own.—H. S. DAVENPORT (Melton Mowbray).

Baird's Sandpiper in Sussex.—On Oct. 11th, 1900, at Rye Harbour, Sussex, I shot a nice specimen of Baird's Sandpiper (*Heteropygia bairdi*, Coues, cf. Sharpe, Cat. Birds Brit. Museum, xxiv. p. 570), an immature female. It was identified by Dr. Ernst Hartert, of the Tring Museum, to whom I sent it for that purpose, and was seen in the flesh by both Messrs. A. R. Ticehurst and W. Ruskin Butterfield. It was skinned by G. Bristow,

of St. Leonards. I found it feeding by a large pool in the beach on the west side of Rye Harbour. Its cry was a shrill kind of twitter. Its flight resembled the Common Sandpiper for the first few yards, when it rose for a considerable height, and then plunged suddenly head first to the ground. It was exhibited by Dr. Hartert to the members of the British Ornithologists' Club at their meeting on Nov. 21st. This is, I believe, the first British record, and also, I believe, the first European one. Its length was 6-6½ in.; length of wing, 5 in.; spread of wing about 6½ in.; tarsus, ⅞ in.; hind toe, ⅝ in.; bill in length, 1 in., narrow, straight, and tapering; toes slightly webbed at joint of foot; bill and legs jet-black. The specimen is now in my collection.—MICHAEL JOHN NICOLL (10, Charles Road, St. Leonards-on-Sea, Sussex).

INSECTA.

Vanessa polychloros in December.—On Dec. 30th last I had the unexpected pleasure to obtain a large Tortoiseshell Butterfly (*V. polychloros*), which appeared fluttering against the window. It is a perfect specimen, and is now in my cabinet.—C. S. BUXTON (Fox Warren, Cobham, Surrey).

[Of course this was a hibernating specimen allured to its destruction by the mildness of the present season. We have seen and heard of some other species on the Surrey hills during the same month.—ED.]

BIBLIOGRAPHY.

The Birds of Yorkshire.—Naturalists and others interested in the subject may be pleased to learn that arrangements have been made for the speedy resumption of the publication of Mr. W. Eagle Clarke's excellent work on the 'Birds of Yorkshire,' which has been partly published in the 'Transactions' of the Yorkshire Naturalists' Union, and the continuation of which was interrupted by Mr. Clarke's leaving Yorkshire to settle in Edinburgh. Mr. Clarke and the Yorkshire Naturalists' Union have now secured the services of Mr. Thomas H. Nelson, of Redcar, to continue and complete the task. Mr. Nelson has in his possession the voluminous mass of original and unpublished observations which Mr. Clarke had at his command when writing the instalments which are already in print, and which includes notes, lists, and observations from many of the naturalists who have studied and observed Yorkshire birds. In addition to this is the whole of the information amassed by the late Mr. John Cordeaux relating to the birds of the Humber district, and also the large number of notes which Mr. W. Denison Roebuck has extracted from the very voluminous literature on the subject, and Mr. Nelson's own accumulated series of notes on the birds of Cleveland and other districts, the whole forming an ample mass of material for the purpose. Mr. Nelson will also

be pleased to enlist the co-operation of those who have it in their power to assist him with notes on Yorkshire birds, their history, distribution, migration, nidification, variation, vernacular nomenclature, &c. All assistance will be duly and gratefully acknowledged. Mr. Nelson is now actively at work on the families *Turdidæ* and *Sylviidæ*, which are to be included in the next instalment sent to press. Communications may be addressed to T. H. Nelson, The Cliffe, Redcar.

WE beg to announce that for several years past we have been working upon the subject of the "Birds of Yorkshire," and hope at an early date to publish the result of our labours in book form.—OXLEY GRABHAM, J. BACKHOUSE.

NOTICES OF NEW BOOKS.

Animal Behaviour. By C. LLOYD MORGAN, F.R.S.
Edward Arnold.

WHEN Prof. Lloyd Morgan publishes a book, we know we shall have a real contribution to the little-known subject of animal psychology. Much, very much, is now published on this phase of evolution, and the study of the habits or behaviour of animals other than man demands two factors—carefully observed facts, and the psychological method. The last is here present in its best form; the first is probably still insufficient for the purpose.

The attitude of the writer of this interesting volume to the position of the two dominant schools of thought on the subject, represented by the Neo-Lamarckians and Neo-Darwinians, is one of caution. To the query, "Are acquired modes of behaviour inherited?" a negative answer "is here provisionally accepted." "Granted that acquired modifications, as such, are not directly inherited, they may none the less afford the conditions under which *coincident variations* escape elimination"; and we read again, "The acceptance of the conclusion that acquired modes of behaviour are not hereditary, nowise commits us to the belief that heredity has nothing whatever to do with them."

Not only are observational facts required, but the right interpretation of those observations is a matter of no little difficulty, requiring a trained mind and a scientific method. A rapid observation too frequently promotes a hasty conclusion. Prof. Lloyd Morgan gives a good instance of the danger of this mental pitfall. He had been experimenting with a dog and a crooked stick. A man who was passing, and who had paused for a couple of minutes to watch the proceedings, said, "Clever dog that, sir; he knows where the hitch do lie." The remark was the characteristic outcome of two minutes' chance observation, and was

directly opposed in its essence to the conclusions prompted by the author's half-hour study of the antecedent actions. The detailed observations of our contributor, Mr. Selous, in these pages are an object-lesson in possible bionomics.

The author is somewhat pessimistic as to the solution of the riddle of life. He regards the questions as to "What makes organic matter behave as we see it behave? what drives the wheels of life, as it drives the planets in their courses? what impels the egg to go through its series of developmental changes?" &c., as beyond the sphere of science, which should give one answer and one only: "Frankly, I do not know; that lies outside my province; ask my sister Metaphysics." But this advice does not prevent Prof. Lloyd Morgan from giving us a really wonderful contribution to the psychological interpretation of animal behaviour; every sentence bears the imprimatur of "thought out." Much more evidence might have been procured, but what is given has been selected with care, and is exhaustively and judiciously considered and placed before the reader, to whom the verdict must be left. As an example, we will give one more extract:—"The question has again and again been asked: Do animals reason? And different answers are given by those who are substantially in agreement as to the facts and their interpretation, but are not in agreement as to their use of the word 'reason.' Perhaps, if the question assume the form, Are animals capable of explaining their own acts and the causes of phenomena? the position of those who find the evidence of their doing so insufficient may be placed in a clearer light. This is what is generally meant by the statement that animals have probably not reached the level of rational beings."

Problems of Evolution. By F. W. HEADLEY. Duckworth & Co.

THIS is an able advocacy of the universal action of natural selection, written by a Neo-Darwinian, who we read belongs "to those Darwinians who have thrown overboard Lamarckism"; in other words, followers of a Darwinism freed from all taint of Lamarckian heresy. The book itself belongs to that ever-increasing literature to which the conception of "Darwinism" has given birth, and is one which cannot be neglected by the

student of the dominant phase of thought which now distinctly influences all philosophy, and less evidently moulds ethics and theology as well. Darwinism is no longer the sole property of the naturalist; it has invaded the "social contract," and the doctrine of "natural selection" as loosely used in social economy is often little different from utilitarianism, or what has been well called the cult of *laissez faire*. The last remarks are opportune, because Mr. Headley devotes the second part of his book to "Problems of Human Evolution," and in these pages we can now only refer to his first instalment dealing with the factors of organic evolution.

Mr. Headley surveys these factors under the usual different classifications, *viz.* Heredity, Variation and Death, the Lamarckian Principle, Natural and Sexual Selection, and Isolation, and describes and estimates their powers from the standpoint of his own analysis. The result is a most readable and instructive representation of much evolutionary evidence with advocacy of "selectionist" principles. (The term "selectionist" must now be recognised; it is largely used, and seems to have an *extra* Darwinian definition.) If there were no struggle for existence, many animals would, in a short time, become dominant by number. We have had many examples given us, and now Mr. Headley, who is an ornithologist, adduces the case of the House-Martin (*Chelidon urbica*):—"It is quite common for them to have three broods in the year, and we are not beyond the mark in allowing them four in each brood. In order to avoid any possible exaggeration, we will assume that each pair has eight young ones each season. At this rate, if there were no deaths, there would in five years be six thousand two hundred and forty-eight House-Martins sprung from one pair."

We are glad to find our author is free from the crass Cartesianism so prevalent among many "Neo-Darwinians" of the present day. "The problem of the origin of consciousness puts us on the horns of a dilemma. Either consciousness is present in the lowest forms of life, or else it was introduced at a higher stage of development. The latter alternative is abhorrent to the very principle of evolution. We are driven, then, to believe that even the micro-organisms, whether animal or vegetable, have some consciousness, however dim."

Reminiscences of a Falconer. By Major CHARLES HAWKINS FISHER. John C. Nimmo.

THIS is the account of an old sport genially described by one of its devoted followers, and if we cannot all go "a hawking," we shall still find much sound ornithological information in the volume. It has become almost a proverb that Hawk does not eat Hawk, but Major Fisher gives us instances of a trained Falcon striking dead and "coolly eating a Sparrow-Hawk," and of another trained Falcon most pertinaciously chasing a Merlin. We also read in reference to the nidification of Rooks that it is believed by many falconers and game-keepers, "and specially by that observant class of men, the shepherds on the Wiltshire downs, that Rooks are not adult and do not breed, and are not allowed by the others to make a nest until they are fully two years old or upwards." We were also not aware that Hawks that have been well entered to game may be lost for a time and be none the worse for it. "Indeed, they may be improved by a temporary restoration to freedom, and forget nothing of what they have learnt."

The author charms us with his sincere love of the sport and its Falcons. After one exciting and successful chase of a Woodcock, the Hawk was not disturbed from her well-earned quarry. The whiskey was served out, "and we drank her health all round. Then we, too, set to work at our lunch, and when this very tame pet Hawk had nearly done hers, I went up to her and took her up, and having replaced the swivel in her jesses, and the leash in her swivel, and cleaned her feet and wiped her beak and kissed her, I fastened her to a stone in a lonely burn close by, and witnessed her bathe and dry herself in the sun, preening her feathers to her and our entire satisfaction."

This should be a sport for our recently annexed South African territories. The Transvaal veld is an unequalled area for the pursuit, birds of prey are plentiful, and the right sort can be easily obtained and afterwards trained. Coursers, Plovers, Sand-Grouse, and Francolins would provide good quarry, and we suggest falconry and this book as its introduction to those sportsmen who will gladly welcome a change of occupation to that which has now so long been dominant in that region.

The illustrations, chiefly portraits, are excellent. It may perhaps interest the subject of the frontispiece to know that he

has a double in Surrey, and that the writer of this notice very much astonished a peaceful and non-sporting gentleman by showing him the portrait of Major Fisher as that of himself.

In no carping spirit of criticism, we would point out that the same narrative is given on both pages 54 and 99, which seems to prove that the printer's "reader" had not the keen eye of the trained Falcon.

The Birds of Glamorgan. Compiled by a Committee of the Cardiff Naturalists' Society. Cardiff: South Wales Printing Works, St. Mary Street.

THE very name of Cardiff inspires a view of docks and coal-mines rather than the sylvan haunts of birds, and we read in the introduction to this very handsomely printed avian enumeration that the establishment of the iron industry and the working of the coal-measures have contributed to reduce the number and variety of "our bird species." Still, Glamorgan is not wholly given up to the devastating instincts of commercial man, and a list of its birds compiled to-day will be material to compare a hundred years hence with what its avian fauna may be then.

The list contains the names of two hundred and thirty-five species, including such rarities as the Rusty Grackle (*Scolecophagus ferrugineus*), a native of boreal regions, shot near Cardiff in 1881; the Little Carolina Crake (*Porzana carolina*), captured at Cardiff in 1888; and Pallas's Great Grey Shrike (*Lanius major*), shot near Bridgend in 1881. We quite agree with the condemnation of the practice of providing a violent death for strange birds; but may we not ask how we should have recorded the presence of two out of the three above birds without the aid of the gun. It is pleasant reading to find that the Kingfisher still abounds, that the Goldfinch is on the increase, the Hawfinch is pushing westward and is breeding in the county, the Merlin is regarded as common, the Kestrel is abundant, and the Sparrow-Hawk fairly numerous, notwithstanding the persecution of the game-keeper; but, on the other hand, the Marsh-Harrier is supposed to be now extinct, and the Hen-Harrier as almost so, the Chough has decreased very much of late years, while the same remark applies to the Land-Rail.

The excellent print and general "get up" of this book is worthy of all commendation.

EDITORIAL GLEANINGS.

‘INDEX ANIMALIUM.’—By ‘Index Animalium’ is meant an index to the generic and trivial names (which together make the specific name) given to all animals, whether fossil or recent, by all authors between the years 1758 and 1900. Such an index aims at providing (1) a complete list, (2) a complete entry for proper quotation, (3) an exact date to each entry. The compilation of this great list was commenced by Mr. C. Davies-Sherborn in 1889, and the MS. is housed under the care of Dr. Henry Woodward at the British Museum (Nat. Hist.). Dr. Woodward, who, with the late Sir W. Flower and Dr. Günther, takes special interest in the work, offered the loan of the necessary cabinets for the slips, and the space necessary for the cabinets, so as to ensure safety from fire or other destructive agencies. The British Association, the Royal Society, and the Zoological Society have assisted with funds; while other Societies have assisted with books, or given various facilities for study. The present Committee appointed by the British Association consists of Dr. Henry Woodward (Chairman), Dr. Sclater, Mr. Hoyle, the Rev. T. R. Stebbing, Mr. McLachlan, and Mr. Bather. About two years ago Dr. Sclater suggested that a special effort should be made to get ready for publication the first portion (1758–1800). This has now been done, and the question of printing is under discussion. At the same time it may be mentioned that many thousands of slips belonging to the 1801–1850 portion are already prepared, and the printing of one part and the compilation of the other will go on simultaneously. Such a labour of love—for it really amounts to that—should prove of considerable use to those who live away from libraries; while to librarians it will be of incalculable benefit, if it only induces a proper method of quotation, instead of the slipshod present method, only too common even among entomologists. A special point about the references is that they include not only the original, but also each case in which the trivial name has been associated with another generic name. The compiler has carefully avoided synonymy, and has arranged his entries under species in one alphabet, in which the generic names fall into their proper places. During the progress of the work Mr. Sherborn has published numerous papers on the dates of books that were issued in parts, perhaps the most valuable of which to an entomologist are those dealing with Hübner and Esper. It is calculated that Part I. will deal with 60,000 entries, and no

doubt a great step will be gained as to exact nomenclature when the Index issues from the press.

It has long been known that certain beetles, notably the Longicorns, squeak loudly when excited, the sound being produced by the friction of a file-like area on some part of the body against an adjoining edge as the parts are moved rapidly over one another. Stridulating organs seem, however, to be far more common among beetles, and much more diversified in position, than has hitherto been thought to be the case. Mr. C. J. Gahan, giving an account of these organs in the 'Transactions' of the Entomological Society (Part III. 1900), has enumerated several genera and not a few families in which their presence had previously been barely suspected, if not altogether unknown. The Longicorns, it would appear, can no longer claim to contain the greatest relative number of stridulating species, for in this respect they are exceeded by the *Megalopidæ*, while the *Endomychidæ*, *Clythridæ*, and *Hispidæ* seem to run them very close. The *Tenebrionidæ* also, and the *Curculionidæ*, furnish a considerable number of stridulating genera; and Mr. Gahan has shown that in the latter family the stridulating organs are not restricted to the males, as stated by Landois, but are frequently found also in the females, in some genera in the same position as in the male, in others in a different position. Genera of other families also are mentioned, in which the stridulating organs differ in position or structure according to sex, or are found in one sex only, usually the male. Darwin believed that the stridulating organs of beetles, like those of Crickets and Grasshoppers, serve as a sexual call, and have been gradually perfected by a process of sexual selection. Mr. Gahan, while accepting this view so far as it relates to the majority of adult beetles, points out that it is quite inapplicable to the stridulating organs discovered by Schiodte in the larvæ of several forms, some of which are even more perfectly developed than in any of the adult insects. Amongst other interesting facts to which he calls attention, is the great resemblance in position and structure which the stridulating organs of genera belonging to totally distinct families may have to each other, while at the same time the position of these organs may be quite different in genera belonging to one and the same family.

WE have received a 'Guide to the Zoological Collections exhibited in the Bird Gallery of the Indian Museum' (Calcutta), by Mr. F. Finn. This is a primer on Indian Ornithology rather than a list of names or an enumeration of species. With this guide any fairly intelligent visitor who would take the trouble to read and examine the birds would return with some knowledge of avian matters of a sound and useful character. It is published by the Trustees of the Indian Museum.

THE VICTORIAN ERA has closed. By the death of the Gracious Lady who has so long reigned Queen over this realm, an epoch marked by giant strides in the development of our industries, arts, and sciences has terminated. We can as little separate the sympathy of the Queen with human progress as we can overestimate the close relationship she held with all that was best in her people; such things are felt rather than seen or written.

As zoologists—few of us, indeed, having lived during any other reign—we see focussed in this period the rise of modern thought. In geology—uniformitarianism; in biology—the unfolding principles of evolution. If strange animals were once brought to Imperial Rome, how can we estimate the zoological treasures we have acquired from our Greater Britain? It is not beyond reason to say that a Natural History descriptive of the fauna and flora of the regions now known as British would represent the main features of Animated Nature.

The Head of our polity has passed away. It has at least been our privilege to largely make the journey through life in the Era of Victoria.

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THE TRUE QUAGGA.

BY GRAHAM RENSCHAW, M.B.

It was said of William the Conqueror that "he loved the tall deer as though he were their father." If this be true, then he has in these latter days been only too faithfully imitated in South Africa by Boer and by native alike; for the love which they have displayed towards the great game animals of the region between the Cape and the Zambesi has been so paternal that of the teeming millions of Mammalia which formerly graced veldt and karroo, but a sadly diminished remnant has escaped their devastating solicitude.

The sad list of vanished or vanishing species already includes the Blaauwbok, an Antelope whose brief history is a record of speedy extermination at the hands of the early settlers; the Bontebok (its curious and striking colouration constituting it a veritable mammalian magpie), only lingering under special protection near Cape Agulhas; the Blesbok, whose numbers to-day are but a shadow of its vast old-time legions; the White-tailed Gnu, strange apparent mixture of Buffalo and Pony, yet a true Antelope; the White Rhinoceros, huge yet harmless, a four-footed Dodo; the Mountain Zebra, whose decimated numbers seem to be likely to suffer still further reduction owing to its destruction of wire-fencing; the great Eland, once plentiful in Cape Colony itself, a lovable creature, with the meekness and even the superficial appearance of a Jersey Cow; and the South

African Giraffe, a handsomer animal than the northern species, from which it has only recently been recognised as distinct.

The regret at the loss—actual or threatened—of these fine beasts, though real enough to the naturalist, is mainly sentimental; but there remains one species whose strength, speed, and proved docility only render its total extermination at the hands of the Boer hunters a matter for deeper concern.

I refer to the handsome true Quagga of the Cape Colony and Orange Free State—*Equus quagga* of modern zoologists, *quacha* of the Hottentots, *idube* of the Kaffirs—formerly found in enormous herds on the plains south of the Vaal River, but now, in spite of all assertions to the contrary, utterly exterminated. In general proportions, and in the mane, tail, and hoofs, it was semi-equine; body-colour rufous-brown, changing to fulvous posteriorly, and fading into white on legs, tail, and abdomen. The head was striped in Zebra fashion; the neck was handsomely banded alternately with dark brown and white, these stripes fading on the withers, and becoming rapidly fainter posteriorly, the darker markings persisting on the haunches as vague lines and spots. The iris (judging from a plate which I have seen drawn from life by Waterhouse Hawkins, and depicting the pair of Quaggas formerly living in the Knowsley menagerie) was orange-brown. The mane was erect and thick; the tail reached to the hocks. Quagga foals resembled their elders in colouring, though, judging from Sparrman's remarks, these colours were probably brighter in the youngsters. Like little Zebras, young Quaggas had their coat rough and long.

The curious former association of the Quagga with Ostriches and White-tailed Gnus (exactly paralleled by the mixed herds of Burchell Zebra and Brindled Gnu) was long ago observed and commented upon by Harris. We also know that the Quagga, though fleet, could be overtaken by a well-mounted rider; that wounded animals at bay would kick savagely and bite severely; that the flesh was oily and disgusting to Europeans, though relished by the natives; and that the northern limit of the range of this species was the Vaal River. Beyond these scanty details, however, but little seems to have been recorded of the wild Quagga, and a few particulars of the animal in captivity complete all that will ever be known of this vanished equine.

When taken young the Quagga could be readily tamed ; it would also interbreed with the Horse. Sparrman, who visited the Cape towards the end of the eighteenth century, mentions that the first example of the species he met with was a sleek well-kept individual, very tame, and fond of being caressed by visitors. He also states that he saw a Quagga driven in the street harnessed with five Horses ; and advocates the domestication of the animal, urging that it could at that time be more easily obtained than the Horse, that it would naturally eat the coarse grass of the country, and would probably be immune from the horse-sickness. About 1815 Lord Morton, with the praiseworthy desire to domesticate the species, obtained a Quagga stallion ; but, being unable to procure a mate for the animal, bred from the Quagga and a mare of seven-eighths Arab blood a curious female hybrid of a dun or chestnut colour, faintly striped on neck and withers, the knees and hocks being also barred. Darwin also relates that Lord Mostyn bred a hybrid between a male Quagga and a chestnut mare. Sheriff Parkins' experiment, carried out some time previous to 1826, was of a more practical nature ; and his two beautiful Quaggas (not a *pair* as often stated), harnessed to a phaeton, were frequently to be seen in Hyde Park and other fashionable places. Like other Society beauties, one of these Quaggas had his portrait painted ; this work, by Agasse, still hangs in the Royal College of Surgeons, Lincoln's Inn Fields, where I have recently inspected it ; and the woodcut illustrating the article "Quagga," by the late Sir W. H. Flower, in the 'Encyclopædia Britannica,' is taken from this painting. Many years later Lieut.-Col. C. Hamilton Smith drove a Quagga in a gig. He seems to have been well pleased with it, and states that its mouth was fully as delicate as that of a Horse.

Let us now trace the history of the true Quagga from the sunny days of its prosperity to its decline and fall. For centuries it had thronged the veldt, its numbers unthinned by the hunter's rifle, and but little affected by the primitive weapons of the natives. When the Cape was opened up by the early settlers it gave way but slowly at first : we may note, however, that in 1820 Thomas Pringle, the South African poet, and the friend of Sir Walter Scott, observes that the Quaggas and Hartebeests had

already almost totally disappeared from the open pastures of the Albany district of Cape Colony, to which they had formerly given life and interest. This may be taken as the first definite mention of the retreat of the true Quagga before advancing civilization—a merely natural though regrettable result of the progress of the white man. When Captain (afterwards Sir) W. Cornwallis Harris, in 1836, penetrated into the far interior, he found the true Quagga abundant on the plains south of the Vaal, whilst north of that river it was replaced by the equally plentiful Burchell Zebra; and, indeed, the exuberant profusion of other great game was on a similar scale, for the spreading veldt was alive with Eland and Gnu, Rhinoceros and Springbok; whilst the glittering salt-pans bloomed with purple masses of Blesbok and Bontebok. We can only in these days see in imagination what Harris saw in reality; yet we can picture the Quaggas in the days of prosperity, feeding in a huge crescent, occasionally emitting a barking neigh, their striped heads turning this way and that, and their snowy tails whisking in the blazing sunshine. Harris, however, tells us that even in his day these animals had disappeared from many places in the Colony where they had formerly abounded, although in the wild interior they still existed in immense herds. The species, though rarer, was yet very far from being extinct. About 1850, however, the Boer hunters appeared. Shooting neither for food nor for legitimate sport, but for hides alone, they attacked without pity the noble game animals which had delighted Harris and many others with their abundance and variety, and ruin fell everywhere on the denizens of this sportsman's paradise. The game at first appeared to defy all efforts to reduce its numbers, but so persistently was the massacre carried on by the hide-hunters in season and out of season, no close-time being allowed, that at last it began to vanish rapidly, and upon the true Quagga, with its now fearfully diminished range south of the Vaal, this persecution fell with double force. These unfortunate animals were exterminated in Cape Colony about 1865, according to Mr. H. A. Bryden; those in the Free State lived a few years longer, though Mr. Buckley's expedition in 1873 already found the animal "apparently unknown." At any rate, as a stuffed specimen was acquired by the Edinburgh Museum of Science and Art as late as

1879, we may perhaps compute that the animals in the Free State may have struggled on for about ten years longer at least than those in the Colony. Like the American Bison, the Quagga was so rapidly exterminated that its loss was never suspected until too late to prevent it; whilst the erroneous name "Quagga" (still employed by those who should know better), being conferred on both species of Zebra in South Africa, encouraged the belief that the true owners of the name had not been lost after all. Again and again one reads that "the rare animal the Quagga" has again turned up, but when the Sea-serpent has been captured one may believe in Quagga stories also; for all these cases, when investigated by competent persons, turn out to refer to Zebras. The true Quagga is gone for ever. *Requiescat in pace!*

When an animal becomes extinct, Science mournfully treasures up the records of its existence, and enumerates with dismal care the poor remnants of skin and bone (*literally*, skin and bone) that may exist, a poor exchange for the life of a fine species. The Great Auk has its historians; the Labrador Ducks, a silent nation, lie in stuffed stillness, redolent of naphthaline, in the drawers of a few known cabinets. Similarly I have thought it might be valuable to brother zoologists if I collected a list of all specimens, living and dead, which have represented *Equus quagga*, either alive in Zoological Gardens, or as prepared specimens in Zoological Museums.

After immense labour and correspondence, it appears that the following Quaggas have figured amongst the attractions of European menageries:—

(1) The Windsor Quagga, imported into England during the eighteenth century, and kept at Windsor as the property of the then Prince of Wales.

(2) The late Prof. Alphonse Milne-Edwards informed me, only a month before his lamented death, that the famous Jardin des Plantes at Paris had once possessed a Quagga, which lived to eighteen or twenty years of age in the menagerie. It was described by Cuvier in 1821.

(3, 4) A pair of Quaggas formed one of the varied attractions of the great Knowsley menagerie. On the death of Lord Derby in 1851 the menagerie was sold, and the female Quagga purchased for the Amsterdam Zoological Gardens. Some time afterwards

this animal gave birth to a curious hybrid, the father of which was an Asiatic Wild Ass (*Equus hemionus*).

(5, 6, 7) Three Quaggas (not two as I have seen stated) have been exhibited by the Zoological Society of London—(a) an animal which died fully adult, as I judge from examining the skull, some time previous to 1838 (skin and skeleton mentioned in Waterhouse's old catalogue); (b) a female purchased in 1851; (c) a male, presented by Sir George Grey in 1858. This animal was photographed alive in 1872, when its wild brethren were already in the throes of extermination.

(8) A Quagga was formerly exhibited alive at the Berlin Zoological Gardens; its skin and skeleton are now in the Museum für Naturkunde.

(9, 10, 11 ?) "Several" Quaggas were obtained about 1870 by the Belgian consul at Port Elizabeth, and sent to the Antwerp Zoological Gardens.

No Quagga foals have ever been born in captivity. After careful inquiry, I learn that this species has never been exhibited in the Zoological Gardens of Bristol, Cologne, Dublin, Frankfort-on-Main, Hamburg, Hanover, Lisbon, Marseilles, or Rotterdam. Thus ends the brief record of the living animal, which has passed away for ever, with all its latent qualities for domestication unused, and even its habits but imperfectly known.

To turn to the last portion of this essay: the census of known remains—a melancholy inventory at best. In 1898 I contributed a short article to 'The Zoologist' on "Existing Specimens of *Equus quagga*," giving only a very short list, and suggesting that somebody should take the matter up, and compile a complete census of relics, little thinking that one day I should myself essay the task. The results of a laborious undertaking are here summarised; and I hasten to express my thanks to all those scientific gentlemen who in Europe, South Africa, and the United States have so kindly aided me with information. The census is as follows:—

The United Kingdom.—(1) The newly-mounted old skin of the first Quagga possessed by the Zoological Society of London now stands in the Mammal Gallery of the Natural History Museum at South Kensington. It seems probable that this is the identical skin which Harris figures at the end of the article "Quagga,"

in his famous 'Portraits of the Game and Wild Animals of Southern Africa.' The skull and skeleton of the same individual are also in the National Collection.

(2) The Royal College of Surgeons Museum contains the skulls of the two Quagga stallions once driven by Sheriff Parkins. I have examined both specimens; they belonged apparently to animals in the prime of life.

(3) The Tring Museum possesses a beautiful Quagga mare; the markings are particularly distinct.

(4) The Science and Art Museum at Edinburgh has a stuffed Quagga (sex unknown) amongst its zoological treasures.

(5) The Yorkshire Philosophical Society's Museum (York) contains an equine skeleton alleged to belong to this species. On inquiry, unfortunately, I found that no data were obtainable.

(6) I have examined an equine skeleton in the Medical Museum of the Owens College, Manchester; it is said to be that of a true Quagga, an opinion in which I concur, as the skeleton has a squarish diastema and stout nasal bones, unlike the oblong diastema and elongated nasals which I have found to characterise the skull of the "Quagga" of modern hunters, *i. e.* Burchell's Zebra.

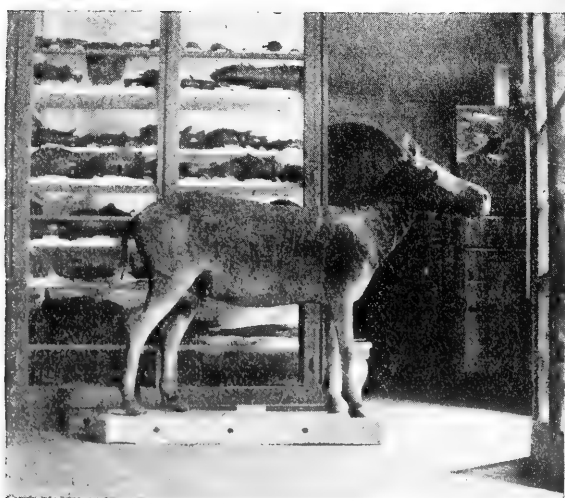
United States.—I am informed that the Academy of Natural Sciences at Philadelphia possesses a roughly cleaned skeleton of *Equus quagga*, presented by the late Prof. Cope. No data are to hand, unfortunately.

Continent of Europe.—(1) I have three times examined the stuffed Quagga stallion in the Natural History Museum of the Jardin des Plantes, Paris. It is evidently of great age, and the late Prof. A. Milne-Edwards suggested that it may have been brought home by Perron and Leseur. The taxidermist has provided it with old-fashioned glass eyes, thus giving to an herbivorous animal the circular iris of a cat! In the same museum-case is preserved the type-specimen of Grevy's Zebra (*Equus grevyi*).

(2) The Natural History Museum at Leyden is celebrated for many rarities; it not only has the priceless treasure of a real mounted Blaauwbok, and also a stuffed White Rhinoceros, but in addition possesses a Quagga stallion, and also the perfect skeleton of the animal; all these rare specimens, by the kindness

of the Museum authorities, I have recently been enabled to photograph.

(3) The Quagga formerly at Knowsley is now preserved at Amsterdam, splendidly stuffed and mounted (the glass eyes are actually of the same colour as figured in Waterhouse Hawkins's coloured plate of the living animal). I had in May last the opportunity of examining and photographing this, perhaps the finest example in existence, as it stood in the Museum of the Amsterdam Zoological Society.



Quagga Stallion in the Natural History Museum at Leyden.

(4) I am informed that the great Zoological Museum at Turin contains a stuffed Quagga and its skull, obtained at the Cape in 1827.

(5) I saw a stuffed Quagga in the Natural History Museum at Berne in 1895. It is to be regretted that this valuable specimen is not protected by glass from dust and injury.

(6) Dr. Möbius kindly informs me that the Berlin Museum possesses not only the stuffed skin and skeleton of the Quagga formerly living in the German capital, but also a skeleton received in exchange, and two skulls.

(7) A stuffed Quagga and skull is preserved at Munich.

(8) There is another stuffed example at Mainz.

(9) The Director of the Senckenbergian Museum at Frankfurt-on-Main kindly informs me that the collection includes a stuffed Quagga and its cranium, obtained in South Africa in 1831.

(10) Dr. Steindachner informs me that the Vienna Natural History Museum has a good stuffed example of *Equus quagga*, but no skeleton.

(11) Stockholm. Great interest attaches to the little Stockholm specimen. It appears to be *the only fœtal specimen* in existence, and is more than a century old, having been brought home by Sparrman himself. It is thus the most venerable relic of the Quagga in existence. From a photograph very kindly forwarded by Mr. F. A. Smith, it appears that the coloration is much as in the adult.

South Africa.—After repeated inquiries it appears that the only specimen preserved in all South Africa (the former home of the species, where its teeming numbers flourished so abundantly in the old days) is in the Capetown Museum! Mr. W. L. Sclater has very kindly forwarded me a photograph of this Quagga, and informs me that it was presented to the Museum by Mr. A. Dale, of Beaufort West, previous to 1862. As Sparrman's Quagga is the only *fœtus*, so it appears that the Capetown Quagga is the only *foal* in existence. The rough coat of the young animal is well shown in the photograph.

This completes the census. After much correspondence I learn that there are no specimens of *Equus quagga* in the Museums of Aberdeen, Brussels, Breslau, Chicago, Copenhagen, Dresden, Dublin, Durban, Florence, Geneva, Grahamstown, Hamburg, New York, Oxford, Prague, Pretoria, Pietermaritzburg, and Washington. The so-called Quagga at Bristol is only *Equus burchellii*.

Amongst the natural history specimens sold at Stevens's Rooms on Aug. 22nd, 1899, was "Lot 240. Skin of Quagga, now extinct." I have been unable to authenticate or trace this specimen.

And so the curtain rings down on *Equus quagga*, one of the finest, most interesting, and most docile of the fast vanishing African fauna—a species which might have been of great value in

a continent infested by the Tsetse Fly, and cursed with the horse-sickness; massacred and exterminated for the miserable value of its hide by the very people it was so well fitted to benefit! The list of dying species grows apace: Blaauwbok; true Quagga; next the White Rhinoceros; then Bontebok, Blesbok, White-tailed Gnu, Mountain Zebra, Unstriped Eland, Southern Giraffe, Elephant.

Di avertite omen!

OBSERVATIONS ON THE NOCTULE.

BY CHARLES OLDHAM.

IN the neighbourhood of Alderley Edge, and, indeed, throughout the wooded parts of the Cheshire Plain, the Noctule, *Pipistrellus noctula* (Schreb.), is abundant. A hollow tree, or less frequently a house-roof, serves as a diurnal retreat, whence, during the warmer months, the Bats issue to feed soon after the daylight has begun to wane. On fine summer evenings one's attention is often attracted by the shrill squeak of the Noctules which are flying in company with the Swifts, at an altitude difficult to estimate accurately, but certainly not less than from seventy to eighty feet. This squeaking note is pitched so high that it is inaudible to many ears. As the light fades, the Bats descend to a lower level, and feed at a height of from fifteen to thirty or forty feet above the fields, pools, and open places in the woods. The crunching of their jaws as they masticate their insect prey may then be heard distinctly.

The time at which the Noctule issues from its retreat does not always bear the same relation to the hour of sunset, and sometimes differs considerably on consecutive evenings. Wind, temperature, and other atmospheric conditions, rather than the actual hour of sunset, probably determine the time at which the Bats emerge, and the duration of their flight. Rain, if not heavy, does not incommode them whilst feeding, but if the night be cold and windy few or none will be seen. It is probable that individual Noctules do not always resort to the same den throughout the summer, for the numbers which emerge in the evening are not constant, and even on consecutive evenings, when the atmospheric conditions appear to be identical, the number sometimes varies considerably. On the other hand, it is possible that on some evenings the whole strength of the colony does not turn out, and that some of the Bats remain in the den all night.

On April 5th, 1896, Mr. T. A. Coward and I watched Noctules sallying forth for their evening flight from a hole beneath the

eaves of the church at Nantglyn, Denbighshire.* The first, which emerged at 7.15, was followed at short intervals by seven others, and at 7.27 between twenty and thirty appeared in quick succession. On several evenings in the spring of 1900 I timed the Noctules as they left their den in the dead limb of a beech at Alderley Edge, and later in the year I made some observations on a second colony which had its quarters in the hollow trunk of a living Scotch fir in the same district. The results are summarised in the following table:—

	Date.	Sunset at Green-wich.	Approximate time of sunset at Alderley Edge.	Number of Bats.	Time of Appearance.	Time at which first Bat entered hole on return.
Colony in Beech.	April 18th	6.58	7.11	10	7.37-7.40	—
	„ 21st	7.4	7.17	4	7.45-7.46	—
	„ 26th	{ Windy and cold. I watched from 7.35-8.20. No Bats appeared, although they were squeaking in the den.				
	May 3rd	{ Windy and very cold. Bats again squeaking, but none emerged between 7.45 and 8.20.				
	„ 4th	7.25	7.40	20	7.58-8.4	—
	„ 6th	7.28	7.43	15	7.58-8.0	—
Colony in Fir.	August 5th.....	7.40	7.56	9	8.12-8.13	—
	„ 10th.....	7.32	7.47	9	7.58-8.3	9.5
	„ 12th.....	7.28	7.43	4	7.50-7.59	9.7
	„ 13th.....	7.26	7.41	2	7.46-7.49	—
	„ 14th.....	7.24	7.39	6	7.32-7.44	—
	„ 15th.....	{ I caught three Bats—all females—as they emerged this evening.				
	„ 23rd.....	7.6	7.20	5	7.29-7.31	—
	„ 27th.....	6.57	7.10	22	7.29-7.30	8.24
	„ 30th.....	6.51	7.4	19	7.2-7.8	8.41
	„ 31st.....	6.48	7.1	16	6.55-7.4	—
	September 3rd	6.42	6.54	27	7.7-7.11	8.22
	„ 4th	6.40	6.52	24	6.56-7.1	7.53
	„ 5th	6.37	6.49	27	6.59-7.4	7.58
	„ 7th	6.33	6.44	17	6.48-6.51	—
	„ 9th	6.28	6.39	18	6.53-6.56	7.54
	„ 17th	6.10	6.20	6	6.28-6.29	—
	„ 29th	5.42	5.42	17	6.6-6.8	—

* The Noctule, although probably common and generally distributed, has been recorded from but few Welsh localities. Mr. G. H. Caton-Haigh states that it is common in Merionethshire (Zool. 1887, p. 293). In May,

The time at which the first Bat issued from the hole varied from twenty-eight minutes after sunset, on April 21st, to seven minutes before sunset, on Aug. 14th. The Bats leave the den in rapid succession—on Aug. 27th twenty-two emerged within a minute—but their return is much less regular. This is probably due to the varied success of individuals in obtaining food. During August and September, at any rate, on fine still evenings, the duration of the vesperinal flight is sometimes less than an hour; on Aug. 27th a Bat entered the den fifty-five minutes, and on Sept. 4th fifty-seven minutes, after the first had emerged. On each evening, however, the flight in some cases lasted at least an hour and a half; and on Sept. 5th some of the Bats were absent for more than two hours. It is probable that on wet and windy evenings the duration of the flight is even less than an hour, but I have no data to prove this. It is easy to count the Bats as they leave their den in the twilight, but a difficult matter to make sure of the number that return. They do not often enter the hole immediately on their arrival, but dash round and among the trees, and in many cases pitch several times for an instant on the tree-trunk near the hole. Their advent is proclaimed by the beating of their wings, but even on moonlight nights all that one sees is a form silhouetted for an instant against a patch of sky. When the Bat is flying against a background of tree-trunks or foliage one can see nothing. It is true that a faint rustle may be heard when a Bat actually enters the hole, but this resembles the noise made when it pitches for an instant on the tree-trunk, and if two or more Bats arrive together, as often happens, the confusion is increased. A good deal of intermittent squeaking may be heard in the den after the arrival of the second Bat. The following extracts from my note-book describe the course of events on three evenings:—

Sept. 3rd.—Fine moonlight evening; no wind. First Bat emerged at 7 7, followed by twenty-six others before 7.11. Much squeaking for half an hour before they appeared. None seen or heard until 8.22, when one returned and entered the hole, after

1898, I saw several flying above the Beaver's Pool, on the Conway, near Bettws-y-Coed. In August, 1895, Mr. T. A. Coward saw many at Nevin, Carnarvonshire. The Bats, which were flying low over the fields at the edge of the cliffs, appeared to be feeding on the winged males of a black ant.

pitching for an instant and dashing away again eight times. Others kept dropping in until 9.38, when I left. At 8.49 three or four were dashing round the tree at once. Intermittent squeaking in the den as the Bats returned.

Sept. 4th.—Fine moonlight evening; no wind. The first Bat was out at 6.56. Twenty-three more followed before 7.1. No further sign of Bats until 7.53, when one arrived; two others at 7.59. From then until 8.30 many came. Twice in that time there were three or four at once. On the whole the Bats returned much earlier than last night, although there was no apparent difference in the atmospheric conditions.

Sept. 5th.—Another fine still evening; moonlight. Twenty-seven Bats left the den between 6.59 and 7.4. The first returned at 7.58, the second at 8.4. From then until 8.50 many returned, singly and by twos and threes. Others put in an appearance until 9.20, when I left, but there was a marked falling off in the frequency of the arrivals during the last half-hour.

It may be that the period of activity is not limited to a short vespertinal flight of from one to two hours, and that the Bats leave their den again before daylight; but I do not think so, and for this reason. A captive Noctule which I had for some weeks during the summer used to wake up between 7 and 8 o'clock in the evening, and become very active, climbing about the box in which it was confined, and squeaking vigorously. When, as sometimes happened, I was unable to feed it until two or three hours later, it relapsed into the lethargic sleep which characterizes Bats in the daytime, and I had to rouse it again by warming it in my hand.

Noctules scuffle and squeak for half an hour or more before leaving their dens in the evening, and this squeaking may be heard sometimes even at midday. In Alderley Park, at noon on July 15th, Bats, presumably of this species, were squeaking in a Woodpecker's hole in a tall beech, and during the morning of Aug. 5th the noise made by the Bats in the hollow Scotch fir on the Edge was very noticeable.

This species changes its feeding-grounds at different times of the year. For some weeks about midsummer Noctules may be counted by scores on almost any evening along the road which skirts the foot of Alderley Edge on the north, but in spring and

late summer the Bats will be sought in vain at this place.* Their presence or absence is no doubt determined by the distribution of the insects upon which they feed.

From the beech, whence I had watched the Noctules fly early in May, I obtained nineteen on the 8th of that month. Their den was in a hollow limb about forty feet from the ground. The cavity, between two and three feet in length, was dry and warm in its upper part, and impervious to wind and rain, whilst near the lower end egress was possible by several crevices and an old Woodpecker's hole. At 7.15, some three-quarters of an hour before their time of flight, the jarring of a ladder against the tree caused some of the Bats to squeak. When I broke away the dead wood, however, and exposed them to the daylight, they made no attempt to escape, but remained huddled together in a comatose condition in the upper part of the cavity, their low temperature during sleep being apparent when I handled them. As I detached them from the sides of their den, to which they clung tenaciously with their feet, hanging head downwards, one wakened sufficiently to escape. The others, placed in a linen bag, were transformed in a minute or two from cold inert creatures to a hot struggling mass. Of the nineteen Bats secured, all but three were males. The majority were liberated at once, and took wing with ease from the flat surface on which they were placed. I retained a couple, as did my friends Messrs. T. A. Coward and F. S. Graves, and we were thus able to check one another's observations on the actions of the Bats in captivity. This species takes kindly to confinement; one of the Bats, an old female, and the principal subject of the following notes, was at the end of eleven weeks in perfect health and condition. Of the other captives, one was accidentally poisoned, and four were released after a few days.

The Noctule, like other Bats in captivity, shows little inclination for flight, especially in an artificially lighted room, and, when it does take wing, frequently collides with the walls and furniture. A confined space is indeed unsuited to its bold and dashing flight, although in a darkened room it will remain on the wing for some time and avoid accidents. In walking—a captive Bat's usual mode of progression—the body is carried clear of the

* Cf. 'Zoologist,' 1895, p. 167.

ground, and supported on the feet and wrists only. The tail is curved downwards and forwards, and the interfemoral membrane pressed against the belly. The fore limb is spread considerably, but the phalanges with their connecting wing-membrane are tightly closed and folded back along the lower arm. In ascending a curtain or picture-frame, the claws on the thumbs are brought into use, and the tail, instead of being curved beneath the body, is then extended backwards, with the tip pressed closely against the surface of the object up which the Bat is climbing. For the time being it is analogous to the stiffened retrices of a Woodpecker or Tree-Creeper.

Any instinctive dread which Bats may have of man disappears quickly in captivity, but the Noctule is exceptionally fearless. Within a few minutes of their capture, I took two of the Bats singly from among their struggling fellows in the bag, and, holding them in one hand, offered mealworms with the other. So cramped were they that they could not move their limbs, but they seized and devoured the insects with the utmost *sang froid*. On the same evening others were climbing about my arms and neck without any signs of fear; and the old female which I had for several weeks used habitually to clamber up my arm as it rested on the table, and snuggle against my neck.

Before settling down to sleep after it has fed, the Noctule, like other Bats, goes through a somewhat elaborate toilet. The wings and interfemoral membrane are thoroughly cleansed by licking, and the fur of the whole of the body is scrupulously combed, the sharp claws of the toes being well suited for the purpose. During the process the Bat frequently sucks its toes, the moisture serving doubtless to keep the beautiful golden fur sleek and clean. No one who has watched a Bat clean itself, as it hangs suspended first by one foot and then the other, can fail to be struck by the creature's suppleness and agility.

In another respect this species resembles all the Bats I have kept in captivity. It never attempts to pick up food which it has accidentally dropped. It is true that when running about the table a Bat may encounter a half-eaten moth or mealworm, which it will seize and devour, but this is tantamount to finding a fresh insect altogether. If, however, a fragment of beef or a decapitated moth is dropped, and lies on the table immediately beneath

the Bat's nose, or if a partially devoured mealworm succeeds, by dint of its convulsive struggles, in escaping from the Bat's jaws, and instinctively makes for the darkness beneath its body or wings, the Bat makes no attempt to recover it. It usually turns its head from side to side, and then runs forward on the look-out for fresh prey. This failure to recover, or even search for, food which has been dropped is not due to any distaste on the Bat's part, for it will seize and devour the lost prey if it be proffered again. It seems to arise from the absence of any conception that food once dropped can be found again, and no doubt implies that Bats obtain, and have for an infinite number of generations obtained, all their food whilst on the wing. Even if this be so, it is still very curious that a Bat should be able to adapt itself at once to entirely new conditions, and take food readily whilst held in the hand, and yet after a captivity of nearly three months should persistently ignore palatable food which it has dropped, and which lies immediately beneath it.

Bats drink frequently. My captive Noctules sometimes lapped water from a saucer which stood on the table, but generally took the liquid from a camel's-hair pencil, either by lapping, or by taking the brush into their mouths and sucking it. Their food consisted of mealworms (the larvæ of a beetle, *Tenebrio molitor*), raw lean beef, and such moths, beetles, and other insects as I was able to procure. All food was thoroughly masticated by an extremely rapid movement of the jaws before it was swallowed. The wings of moths were generally consumed, but the horny elytra of large beetles were bitten off and allowed to fall as the insect disappeared in the Bat's mouth. Mealworms and small moths, as well as *Cicindela campestris*, and beetles of lesser size, were seized and eaten without any attempt to overcome their struggles. On the other hand, large moths, such as *Xylophasia polyodon* and *Phlogophora meticulosa*, were sometimes, and the powerful beetles *Geotrupes stercorarius* and *Melolontha vulgaris* always, thrust by the Bat into the pouch formed by the interfemoral membrane, in order to secure them effectually before they were eaten.* A Cricket (*Acheta domestica*) offered to one of Mr. Coward's Bats was treated in this way, but Cockroaches (*Blatta orientalis*) were in some instances thrust

* For a description of this habit, see 'Zoologist,' 1899, pp. 471-474.

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into the pouch, and in others eaten without that preliminary. It should be remarked, however, that Cockroaches, despite their size, submitted very tamely to their fate. On no occasion was foot, carpus, or thumb used to secure or dismember prey.

The insects eaten by any creature in captivity cannot be taken as a criterion of its food in a free state, but it may be worth while to note that, in addition to the moths already mentioned, the following, among others, were readily taken by the Bats:—*Mamestra persicaria*, *Leucania pallens*, *Hepialus humuli*, *H. sylvinus*, *H. hectus*, *Rumia cratægata*, *Urapteryx sambucata*, *Odontopera bidentata*, *Fidonia atomaria*, *F. piniaria*, and *Amphidasis betularia*. The Bats appeared to be unable to see food if held but little more than an inch in front of them, and this was the case in natural twilight, as well as in an artificially lighted room. It is therefore very doubtful whether, in a free state, they would avoid a distasteful moth because its nauseous properties were advertised by its warning colours.

That certain insects were distasteful was clearly shown by the behaviour of one of the Bats. It seized a moth (*Euchelia jacobææ*) from my fingers, but dropped it immediately, shaking its head from side to side in evident disgust. Taking the moth in my fingers, I offered it again to the Bat, which declined to touch it. I then held the moth with a pair of forceps, which I generally used in feeding the Bats, as being less susceptible to their sharp teeth than were my finger-tips, and which were intimately associated with food in their minds. The moth was seized at once, but dropped immediately with repeated signs of disgust, and I could not induce the Bat to take it a third time. On the two following evenings I offered it other moths of the same species, doing so before I gave it other food, in order to make sure that it was hungry, but it would not touch them, although it sniffed at them, and probably recalled their nauseous qualities by its sense of smell. On another occasion an example of *Abraxas grossulariata* was seized twice, and then dropped with every appearance of disgust, and I could not get the Bat to touch it again.

Two other moths (*Spilosoma menthastri* and *S. lubricipeda*) appear to be unpalatable, but in a lesser degree. The first time I offered the Bat a *menthastri*, it seized and ate it without

evinced any distaste; but on the next day it dropped another moth of the same species immediately, and then treated a *lubricipeda* in the same fashion, although it was hungry at the time. On the following evening I again tried the Bat with a *menthastri*, but without success. Three days later, however, I induced it to eat single moths of both species, but it dropped them several times, and only ate them eventually after a good deal of pressure. From that time the Bat overcame its distaste for these moths in a large measure, for on a subsequent occasion it ate seven *menthastri* and two *lubricipeda* with apparent enjoyment, but refused a tenth moth, although it was still hungry, and eagerly seized and ate several mealworms and flies.

Both of Mr. Coward's Bats persistently refused to touch an Oil Beetle (*Meloë* sp.) which he offered to them.

THE GRASSHOPPER-WARBLER (*LOCUSTELLA* *NÆVIA*) IN NORTH WORCESTERSHIRE.

BY H. ELIOT HOWARD.

VERY few birds interest me as much, I might almost say none more, than the Grasshopper-Warbler, and the following notes are the result of many years' observation in this county. Probably, owing to the habits of birds varying so widely in different districts, these notes will not be found to agree entirely with the experiences of other naturalists who have studied this Warbler in different parts of the British Islands to myself.

The dates of arrival in this county for the last four years (leaving out 1898, when I was absent) are as follows: 1896, April 19th; 1897, April 23rd; 1899, April 20th; 1900, April 19th. It is certainly much more regular in its time of arrival than the other summer migrants, the dates, as will be seen, varying very little. No matter what the weather is when it first arrives, its note is sure to be heard in the morning—cold, frost, or rain seeming to have very little effect in preventing it singing. As a rule, they will be found at once in the spot where they intend to breed, but I have sometimes found them for the first few mornings after they arrive in hedges by the side of a road. One which I especially noticed last year was singing in a hedge which was absolutely bare, and opposite to which was a farmyard; but they all pass on in a day or two to more suitable breeding haunts.

There are certain places where I can always be sure of finding one or two pairs, and these are for the most part osier-beds which have been cut down two or three years previously. The osiers are then about four feet high, intermingled with hazel, and with very thick undergrowth. These sort of places they seem to prefer for breeding purposes more than any other; but I have found them fairly plentiful in large woods, where the undergrowth is very thick, but in almost every instance there has been water

somewhere near. A few breed in thick hedges, and it was in one of these that I found the only pair breeding away from water of some kind that I have ever found. This was in 1897, when a pair bred in a thick hedge next to a field of corn. They are plentiful enough in this county—you might almost call them common—but, on account of their shy and retiring habits, they are little known and easily passed over.

In the number of arrivals there is great variation—more, I think, than with any of the other migrants; and, if they are plentiful one year, and the young are successfully reared, I have as often as not found that they come in exceptionally few numbers the next year. The year 1897 I remember well, as they visited us in greater numbers than usual. In one osier-bed, about a quarter of a mile long, I found six different pairs; the next year, in the same osier-bed, only one pair, although the conditions appeared to be just the same. In order to see the Grasshopper-Warbler at its best you must watch it for the first few hours after dawn—and indeed this may be said of all birds during the summer months; but at no time is *Locustella naevia* so lively as during the first two hours of daylight, and at no time of the year is it so amusing as during the last week in April and the first week in May. It is then that the females arrive, and they begin to mate. It will repay anyone to sit still for an hour or two at dawn to watch them. The female then walks along amongst the undergrowth, threading her way in and out, sometimes pecking or pretending to peck at something; the male follows a few feet behind, at times picking up a dead leaf in his bill, and carrying it for some distance while following the female, apparently with no object, unless it is a gentle reminder to her that he wishes to commence nesting operations. These operations are generally disturbed by the appearance of another male on the scene, and at once they set to and chase one another, now and then in their excitement settling on a bush and singing for a few seconds; the flight when this goes on is, as a rule, very rapid, and it is not long before he returns to the female and again commences to walk after her, varying the operation at times by crawling up to the top of a bush and commencing to sing.

Directly they are paired they commence nesting operations, the male at this time singing a great deal in the mornings, some-

times on the top of a bush, sometimes low down. When the sun first rises they are fond of sitting on dead branches in order to preen their feathers. If when at the top of a bush he happens to see you, he dives down into the middle and disappears immediately, only to reappear presently, if there is nothing to alarm him, crawling up the middle of the bush and walking along the branches until he gets back to his original perch, when he will again commence to sing. The habit they have of crawling up the bushes is so like that of a Field-Mouse, that I have more than once mistaken the one for the other, the Field-Mouse also being very fond of creeping up the stem of bushes.

The female seems to be more fond of walking along the ground than the male, and when disturbed off her nest slips quietly down amongst the thick undergrowth that generally surrounds the nest, shortly to return providing there is no noise or movement to frighten her.

I have never heard the female utter a note of any kind, though I have many times watched both when mating, and when the young were hatched. She is more difficult to watch than the male, on account of her habit of creeping along the ground; in fact, the only times I have seen the females at all lively is for the first hour after dawn during May and June. At that time the male and female chase one another, and I have seen the female when tired of this sitting quietly on a dead branch of a nut bush, but by sunrise she was off back to her nest. The male in this county sings at most hours of the day and night until the female begins to sit, when he is almost silent, and remains so till the young are out of the nest, then he commences to sing again—that is to say, from the middle of May till about the third week in June.

This habit is curious—in no other bird have I noticed it—and I should be interested to know if others have observed the same thing. I said almost silent, because I once heard one singing very quietly on a hot afternoon early in June. From the time he arrives till the middle of May he sings continuously in the morning, and certainly at times he is very hard to locate, owing to his note sounding farther off than it really is, and *vice versa*, the result of a habit he has of turning his head from side to side when singing. He is also fond of singing at night; but I cannot

say I have ever heard him in the middle of the day, although I have early in the afternoon.

The nests I have found are few, and I remember the first one was by consequence of luck—or rather ill-luck—for I trod on it. It was in the middle of some bent, practically on the ground, and this is the spot they seem to be most fond of for breeding purposes. One very pretty nest I came across about three years ago was between two and three feet from the ground, amongst a lot of long dead grass; the nest itself was built entirely of the same grass, but this is the only one I have found so far off the ground.

The young leave the nest soon after they are hatched. Whether or not two broods are reared here in the year I cannot say, never having found a second one; but the old birds sing during most of July, so probably, in some cases, two broods are reared.

The earliest date at which I have found the young hatched is June 6th, but that was exceptional. In September the young males make an attempt at singing, but it only results in a curious crackling noise; they are certainly more easily approached than the old birds, and at this time of the year I have often seen them basking in the sun on dead branches, when they will allow a very near approach before disappearing into the bushes with that curious habit they possess of flirting their tail.

DISTRIBUTION OF THE STONECHAT (*PRATINCOLA RUBICOLA*) IN YORKSHIRE.

By E. P. BUTTERFIELD.

A DETAILED account of the county of broad acres in this article would be out of place, suffice it to say that Yorkshire is the largest, and, with Lancashire, the most southern of the six northern counties of England, nearly through the centre of which runs the parallel of 54° north latitude, and contains 6095 square miles, or about 3,882,000 acres, and is divided into three Ridings, North, West, and East. The North Riding includes that portion of the county between the river Derwent and the county of Durham, the West Riding being separated therefrom by the Ouse, Ure, and the hills above Wharfedale; whilst the East Riding occupies the south-eastern portion of the county, and is divided by the Ouse from the West, and the river Derwent from the North Riding. One of the most striking physical features of the shire is the great central vale of York, which is narrow and somewhat elevated in the north, but as it approaches the Humber widens out into a large and swampy flat. East and west of this valley is enclosed by tracts of considerable elevation, which in the former terminates in the north in bleak moorlands, which attain a height of over 1000 ft.; in the latter the ground gradually increases in height until it ultimately forms part of the Pennine chain, which in Yorkshire attains some of its highest elevations on Whernside (2414 ft.), Penyghent (2273 ft.), Ingleborough (2373 ft.), and Dent Crag (2253 ft.), whose eastern sides give rise to the waters of the Wharfe, Aire, Nidd, tributaries of the Ouse, which flows into the Humber, the latter of which receives nearly all the drainage of the whole county; the exceptional portions of the county not drained by the Humber being a small portion of the west, which is drained by the Ribble, the north by the Tees, and the east directly by the German Ocean. The elevated tracts of the south of the east of the vale

of York, here called wolds, do not reach to the coast, but form, where the Yorkshire water system combines to form the Humber, a large alluvial tract of country known as the Holderness.

The geology of the county is of a varied character; the limestones and shales form the mountain masses in the north-west, and are succeeded in the south-east by the millstone grit formation; whilst west and south-west of the central vale the carboniferous system attains its maximum development. In the west the Silurian occasionally crops up, and a belt of lias skirts the coast south of Whitby, and after a very circuitous course comes into contact with the chalk near Market Weighton. As might be expected from such a diversity of physical conditions, the climate varies greatly, being dry and bleak in the east, comparatively mild in the central vale; whilst the elevated portions of the west and north-west are marked by a tolerably healthy climate, but are swept by high winds, and have a heavy rainfall. This is well shown by the fact that while the mean annual rainfall of the east is 26 inches, that of the west is 36·44 inches. This heavy rainfall in the West Riding is probably due to the land there being aggregated in mountain masses, and as the prevalent winds are from the west and south-west, they come laden with aqueous vapour, which, on coming into contact with the high ground, is precipitated as rain. This excessive rainfall and low temperature may account to some extent for the absence or extreme scarcity of a few of our summer migrants in the north-west fells.

The Stonechat in Yorkshire used to be regarded as "common and generally distributed in suitable localities"; but, if so once, is so no longer, and is now both local and scarce, and very erratic in its distribution. It is, however, highly probable, if not certain, that formerly it was commoner than at present, at least in the north-western portion of the county, and it is to be feared that, as a *breeding species*, it is dying out. In this district (Wilsden) I am not aware of its having bred for over thirty years, which is very strange, as gorse is quite common on the waste lands, and flourishes up to 1000 ft.

An old friend once told me that he found what he took to be the nest of the Stonechat near here, which must be forty if not fifty years ago. This instance, and another recorded by Mr.

Ellison, of Steeton, which he found some years ago near Keighley, are the only records I know of the breeding of the Stonechat in Upper Airedale. Further north-west, Mr. Peake, in his list of Settle birds, knows but one instance of its nesting in that district (1896); whilst for the Sedbergh district, the extreme north-west, Mr. Richardson states that there is no satisfactory record; and it is marked as of doubtful occurrence for Langthothdale (mid-west). Messrs. Clarke and Roebuck omit it from the list of birds for Washburndale, but it is included in their list for Nidderdale as rare, but unfortunately not stated whether it breeds, and Mr. Lucas omits it altogether from his list of birds of this dale. Mr. Thomasson informs me, quoting from Mr. Backhouse's 'Guide to Upper Teesdale,' that it does not occur in Upper Teesdale; but, curious to say, it breeds, and not uncommonly, in Weardale, the next valley to the north. Mr. Jas. Carter includes it amongst the rarer birds of Leyburn (North Riding), but nothing is said of its breeding; and Mr. Chapman has known of but one nest in Wensleydale. Mr. Tinkler has not observed it in Swaledale, although "he has kept a sharp look-out for it." Mr. Goodchild, however, remarks, relative to its distribution in Swaledale, that the "Whinchat is commonest in summer? Stonechat less common." It is reported to breed near Richmond, but is not said with what frequency, but is omitted from the list of Aysgarth birds. In Ryedale (north-east) it is said to be rarely observed. I did not notice it in the neighbourhood of Whitby in the spring of 1898, but it is quite probable it might have been overlooked, as I have seen it during the breeding season at Flamborough Head. In the list of Flamborough birds, revised by the late Mr. Cordeaux, it is stated to be "resident, but very local." Mr. S. L. Mosley, of Huddersfield, writes me that it "used to be fairly common at Flamborough Head"; but Mr. Oxley Grabham, who resides in the north-east district, remarks, in the 'Yorkshire Weekly Post,' Oct. 10th, 1900, that it is "very local and sparsely distributed" in Yorkshire; so, if it were once fairly common at Flamborough Head, it would appear to be dying out there. The Stonechat is mentioned in the list of birds given by the Rev. E. M. Cole, M.A., for the vale of York, in the excursion circular of the Yorkshire Nat. Union; but, again, nothing is said whether as a breeding species or on migration. Mr. Boyes, of Beverley,

in a letter recently, informs me that "it is fast dying out here. It was never plentiful, always local and scarce, and found in but one or two localities as a breeding species."

In South Yorkshire Mr. Dixon states that it breeds, but does not say whether commonly or but occasionally, in the Rivalin Valley; and the late Mr. Lister includes it in his list of spring migrants. It is certainly rare now in South-west Yorkshire. Mr. S. L. Moseley recently informed me that he had never known of its occurrence in the Huddersfield district but twice; and it is exceptionally rare about Hebden Bridge. There is no doubt but that it occasionally breeds in the Wakefield district, as mentioned by the late Mr. Talbot; and the same remark applies to the Leeds district, though it would appear to breed less occasionally as the north-west fells are approached.

After reviewing all the information to hand regarding the distribution of the Stonechat in Yorkshire, it cannot be said with exactitude to be common in any district, and, contrary to what one might expect, as it was formerly thought to be more of a sub-alpine species, it is more common in the extreme east than in the west, more especially the north-west fells, where it appears to have almost died out as a nesting species, occurring occasionally on migration, but chiefly in spring; and it would be interesting to ascertain whither these are bound, and by what migration route they arrive. So far as my experience goes, this species, other conditions being similar, prefers the coast to the inland districts. Of course these notes are not given with any pretensions to completeness or finality, but as a small contribution to a subject which is much shrouded in mystery; and it is to be hoped they will elicit further information from naturalists in all parts of the county. It might be stated here that the observations of ornithologists would possess a higher value if they would state with clearness whether, in including the Stonechat in any local lists, it was to be regarded as a breeding species, and with what frequency, or merely on migration.

NOTES AND QUERIES.

MAMMALIA.

The Building of a Dormouse's Nest.—A Dormouse (*Muscardinus avellanarius*) that I have had in captivity since the middle of September has built three successive nests. The whole process was so unexpected that an account of it may not be without interest to readers of 'The Zoologist.' The Dormouse was kept in a large box with a glass front, rendering observation easy. The bottom was covered with a thick layer of sand, surmounted by a quantity of fine hay. At first the little animal used to sleep curled up in one corner, where its weight formed a slight hollow in the hay. Soon afterwards it took to burrowing in the hay till it was invisible. The hay and sand used to be changed every few days. It preferred acorns to any other food, and drank a good deal of water, sitting on the edge of the glass, and stooping down till the lips were immersed. It slept all day as a rule, but often woke up for a short time in the afternoon, retiring to rest again till about 11 p.m. I presume it was awake most of the night, as the bulk of its food was taken then. About Nov. 20th the Dormouse ceased coming out in the afternoon; so, supposing it was about to enter on its winter sleep, I stopped changing the hay. A few days later I noticed the hay in one spot was raised into a little dome, where the Mouse was ensconced. This dome increased in size daily, and then a small hole appeared in one side, through which the Mouse could be seen curled up inside. Further, it could be seen that the hay was no longer a mere mass of stalks roughly thrown together, but the stalks in the interior were neatly arranged in concentric curves. In short, the Mouse had made a hollow spherical nest in the middle of the hay. I never saw it at work, however, till one evening about 9 o'clock; I heard it moving, and watched what happened. It was inside the nest, all but its head and fore-paws. These last were working with an energy quite surprising in so indolent an animal, trying to scratch towards it a hay-stalk in front of the nest. Finally it seized it by the middle, and dragged it backwards into the nest. Now, rolling itself into a ball, the Mouse began to revolve inside the nest. Over and over it went, time after time, by its movements smoothing out the hay, at the same time rounding the interior of the nest, and pushing it outwards. There seems no reason to suppose that this Dormouse adopted a different plan of nest-building in captivity from that which it used in

a natural state. The nests, of which I have examined scores around Shrewsbury, are constructed of long grass, with moss, &c., added for warmth. We know that birds build their nests by laying a foundation first, next raising the sides, and finally putting in the lining. It would seem that the Dormouse acts quite differently. Many birds weave their materials skilfully together, using the beak like a bodkin. The Dormouse has no such tool, and does not weave the grass at all. Apparently he puts together a bundle of grass-stalks, and then dives into the middle, taking in other pieces, one by one, always working from the centre, rounding the nest by revolving inside it, and enlarging it by pressing outwards. This first nest was removed to clean the box. A fresh supply of hay was put in; the Dormouse in two nights constructed a second nest as perfect as the first. Afterwards a third was made under similar circumstances, and there he still resides. I never saw him at work on these, as he made them entirely by night.—H. E. FORREST (Shrewsbury).

AVES.

Some Appearances of the Ring-Ouzel at St. Leonards-on-Sea.—I have noticed Ring-Ouzels (*Turdus torquatus*) here during the spring migrations of 1899 and 1900. I saw the first on April 6th, 1899, about midday, near Felsham farm; and on April 15th, 1900, about 7 a.m., I saw another; on Oct. 19th, 1900, I shot a fine specimen (male), and on the 26th I saw three more, all within the same fields. It seems to occur regularly on the autumn migration, about the middle of October, and I should say, judging from my own observations, during the spring migration also.—MICHAEL JOHN NICOLL (10, Charles Road, St. Leonards).

Yellow Wagtails wintering in the Isle of Man.—While on a visit to the Isle of Man, I observed, on Dec. 8th, two Yellow Wagtails (*Motacilla campestris*) on the cultivated land under Maughold Head, by Ramsey. I have never heard of the bird wintering in the British Isles before, but this interesting instance is no doubt due to the extremely mild winters nearly always experienced in the island.—C. H. B. GRANT (Putney).

Notes on the House-Martin and Sand-Martin.—A pair of House-Martins (*Chelidon urbica*) had three young in the nest at Lower Hagley so exceptionally late as Oct. 16th, 1900, after which date no House-Martins were observed in this neighbourhood, the last Swallows being seen on 9th inst. On Aug. 4th a white House-Martin, probably an albino and a young bird, was in company with others circling around in Hagley Park. A small colony of some six or eight pairs of Sand-Martins (*Cotile riparia*) have utilised for their nesting accommodation a wall of red sandstone which is built alongside the cutting of the road at Belbroughton.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Nesting of the Jackdaw.—During the past year two unusual instances of the nesting of *Corvus monedula* came under my observation. In Hagley Park by far the commonest nesting species are Jackdaws, and their numbers might be estimated from two to three hundred pairs, the old trees, the church, and various other buildings affording the principal nesting accommodation. Two pairs, however, constructed their nests in a small plantation of young spruce-firs, and on May 8th both contained eggs. The nests, as is usual elsewhere, were constructed in a very slipshod manner, and seemingly very insecure; no attempt had been made to form a dome or covering over the nest, the hollow in which the eggs rested being quite shallow. In the other instance, which was during April, a pair were building their nest within a cowed chimney of a house close to the park, the entrance to which always varied according to the direction of the wind.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Nightjar hawking May-flies.—When in company with my friend Mr. H. E. Forrest, on May 19th last, watching the hundreds of Noctule Bats and Swifts hawking the May-flies over the River Severn above Bewdley, two Nightjars (*Caprimulgus europæus*) eventually joined the company, and seemed to be equally adept in taking these insects: they remained there for a considerable time—in fact, until too dark for us to make further observations.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Shag in West Suffolk.—An immature Shag (*Phalacrocorax carbo*) was shot on the roof of a house about four miles north of Bury St. Edmunds on December 17th last, which Mr. Travis, the Bury taxidermist, showed me in the flesh a day or two later. The Shag is a far less common bird in East Anglia than the Cormorant, and perhaps not more than half a dozen specimens have been obtained in Suffolk.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

Little Egret in Yorkshire.—Seeing the editorial note in 'The Zoologist' on the proposed continuation of the publication of the Birds of Yorkshire, I am forcibly reminded of a promise I have times and again made myself that I would publish a record of an unrecorded example of the graceful little white *Ardea garzetta*. As near as I can ascertain, it is about twenty-five years ago since the Chester Society of Natural Science acquired an almost complete collection of British Birds, which, judging from the style of mounting and certain records, had been made during the twenties and thirties of the last century. The whole collection was contained in ordinary box-cases, and almost all the larger sheets of glass used in glazing them were of the old "crown" type, bearing the characteristic nodules. Until the year 1886 this collection was stored in the Society's Rooms in Lower Bridge Street, when it was removed to this Museum. I then found

that the majority of the specimens had been so badly attacked by moths and mould that it was desirable to have the greater part of them destroyed. Among the number of those preserved was a very fair specimen of *Ardea garzetta*, and pasted on the back of the case which contained it was a label, turned yellow by age, bearing the following inscription:—"Egret. Male. Shot March, 1826, near Paul Humberside, Yorkshire." All this is quite clear, but there is no trace of initials or name of the owner or collector. The record is, however, intact and indisputable. It only remains for me to add my apology for having kept ornithologists so long in ignorance of such an interesting fact. Besides the foregoing, there were also the following species, bearing labels in the same handwriting:—

Machetes pugnax, Linn.—"Ruff . . . Yorkshire," . . . is all that I can make out. These are two specimens of each sex in breeding plumage. One of the males has a dark purplish ruff finely vermiculated with buff-white; the other is cream-coloured, sparingly marked with isolated blackish vermiculations.

Himantopus candidus, Bon. — Labelled "Long-legged Plover Linconshire." . . . All the rest is illegible.

Milvus iclinus, Sav.—"Kite. Female. Caught in a trap, June, 1824, Eglinton Wood, near Doncaster."

Perhaps it may be well to add that the first named species has been remounted, but before I did this I made a photograph of the specimen as it was originally stuffed.—ROBT. NEWSTEAD (Grosvenor Museum, Chester).

Bittern in Oxfordshire.—A specimen of the Bittern (*Botaurus stellaris*) was brought to me for identification on Jan. 26th, having been shot on that date near Ridge's Weir, on the Thames, by a gamekeeper in the employ of a local gentleman. Though the bird was shot on the Oxfordshire side of the stream, the ornithologists of Berkshire would, I should imagine, be perfectly justified in claiming it as well, seeing that the two counties are there merely divided by the Thames. One of the best authorities on the Birds of Oxfordshire informs me that the Bittern must now be regarded as a rare winter visitor to Oxfordshire. Last year he heard of four specimens having occurred in the county. The year 1900 was, he states, remarkable all over the kingdom for the number of Bitterns which were either shot or seen.—W. H. WARNER (Fyfield, near Abingdon).

The Nesting Habits of Moor-hens.—I have been much interested in the article on Moor-hens by your contributor, Mr. Oliver G. Pike (*ante*, p. 17); and, since he asks if this habit of building nests as landing stages for the young has been observed by other correspondents, I may mention that I have frequently observed it, and that a note to that effect was published in the 'Avicultural Magazine' for January, 1898 (vol. iv. p. 52).

There is also an interesting article on the habits of Moor-hens from the pen of Mr. C. L. Hett in the same journal for December, 1897 (vol. iv. p. 27), in which Mr. Hett expresses the opinion that some of these nests are built by the young themselves.—J. LEWIS BONHOTE (Ditton Hall, Fen Ditton, Cambridge).

Red-necked Phalarope in Lincolnshire.—Though perhaps not so rare on the autumn passage as is generally supposed, the occurrence of the Red-necked Phalarope (*Phalaropus hyperboreus*) seems worth placing on record. During the last week of October, 1900, one of these birds was sent to me by a local Plover-catcher which had just been killed at North Cotes. The same man told me that he had caught a similar bird a few days previously, but had allowed it to spoil.—G. H. CATON HAIGH (Aber-iâ, Penrhyn-deudraeth, Merionethshire, North Wales).

The Names of British Birds.—Mr. H. A. Macpherson, in his note (Zool. 1900, p. 558), joins issue with me on the derivation of Fulmar, and contends that the word has nothing to do with Foumart or Foulmart. In this, I venture to suggest, he is not quite correct. The English used the word originally (in the form of *Foul Mart*) to designate the Polecat, on account of the strong smell for which that mammal is notorious. The word was then borrowed by the Gaels of Scotland, and in the form of *Fulmair* was, for the same reason, bestowed on the Petrel in question. The modern English, in their turn, adopted the Gaelic name, by which the bird is now universally recognised. I think Mr. Macpherson will find, on reference to any trustworthy authority, that I am correct in stating that the word is purely English, and it is through that language that it finds a place in the Gaelic vocabulary. Still, if he can trace the word back to the "purely Gaelic sources" he mentions, I am willing to admit myself in error. *A propos* of Mr. Aplin's query as to Pie having some reference to the pied plumage of the Magpie and other birds, a question of no little interest is raised. It can, however, be easily understood that Pie, though really imitative of the bird's cry, came to be significant of black and white plumage owing to its association with the Magpie. If, on the other hand, Mr. Aplin contends that Picus (with which Pie is akin) has some connection with *pictus*, "painted," his suggestion is probably the correct one. Mr. Aplin also calls attention to the *ch* in Pochard being hard, and cites Poker as another name for the bird. This very fact, instead of making the connection between Pochard and Poacher slighter, in reality considerably strengthens it, since *poach* has an intimate relation to the word *poke* (to thrust). As to the *guille* in Guillemot, there is no manner of doubt that it is the same word as *gull*. The French had simply adapted the Breton (Celtic) form *guelan*, and had added, by way of explanation, their

own word of similar meaning, viz. *mouette* (or *maot*), which is connected with *mew*—a word still found in the Scotch name for a gull, namely, *maw*. In short, Guillemot is a Celtic-Teutonic compound, in which one word explains the other. Finally, Nuthatch does not MEAN, though it may imply, Nut-cracker, but is simply another form of Nut-hacker, *i.e.* Nut-hewer. The bird may HACK at a nut, which may or may not be CRACKED by the blow.—A. H. MEIKLEJOHN (Highworth, Ashford, Kent).

MOLLUSCA.

Molluscs eaten by Wood-Pigeons.—Referring to the notes on this subject (Zool. 1900, p. 484), not only is this usual in wild birds, but also in fancy Pigeons occupying our aviaries; my brother kept a number of the last, which he was in the habit of letting out in early mornings for exercise. After such excursions they fed their young as soon as they returned, and I have frequently cleaned away from round their beaks (*i.e.* of the squabs) remains of Snails and Slugs: these young were always stronger than the young of those who never had their liberty, and consequently had no opportunity of obtaining such food: though, when I have supplied a handful of the large garden shelled Snails, they have been eagerly eaten, smashing the shells as do Thrushes. My outdoor experience teaches me that Wood-Pigeons and others not only partake of, but search for (as eagerly as Thrushes, &c.), such molluscs as are to be found in our fields and inland waters, to which my experience has been confined.—WESLEY T. PAGE (6, Rylett Crescent, Shepherd's Bush, W.).

ORGANIC EVOLUTION.

Non-Protective Colouration in the Variable Hare.—When reading Mr. Marshall's paper on "Conscious Protective Resemblance" (Zool. 1900, p. 536), some remarks of his recalled to my mind a very striking example of how an instinct, born of a protective colouration, may defeat its own purpose under a change of environment. On p. 542 Mr. Marshall quotes Romanes' remarks about the melanic variety of the Rabbit crouching as steadily as the normally coloured type, and rendering itself "the most conspicuous object in the landscape." In March, 1899, Mr. C. Oldham and I observed a number of Variable Hares (*Lepus timidus*, Linn.) on the moors in Longdendale, Cheshire. The weather was mild, and we only saw a single patch of snow, but the Hares were still in their white winter pelage, though most of them had already patches of brown about the head and flanks. These animals are the descendants of some Perthshire Hares which were turned down near Greenfield, Yorkshire, about twenty years ago, and which have increased in numbers, and have spread over a large tract of moorland in Yorkshire, Cheshire, and Derbyshire. In the North of Scotland the
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moors are snow-covered much later than is usually the case in Cheshire, and the white dress would be a distinct advantage to the Hares, but on the milder bare slopes of these English moors it only tends to make them conspicuous. When the Longdendale moors were snow-covered we have crossed them without seeing a single Hare, though their tracks were visible in the snow in every direction. Again, in summer the gray-brown pelage makes them almost invisible, and we very seldom see any. This was not the case this March, for the white spots on the hillsides were noticeable from a great distance against the dark background of brown bracken, ling, and millstone-grit rock, and they certainly were "the most conspicuous objects in the landscape." The Hares were squatting at the entrance to holes among the stones, or under the shelter of overhanging rocks, and, when we approached, remained perfectly still, evidently instinctively trusting to their protective colouration. They crouched when we got near, laying their ears back, and allowing us to approach within a few yards. One did not move until we were only six yards away, and another let us get within ten yards before it bolted. We stood within this short distance, watching their eyes following our movements, and we could see the wind blowing the loose hair from their backs. The forms where they had been sitting were full of shed hair.

If it were possible for the Hares to reason,* it must be evident that they would be conscious that their colour was not in harmony with their surroundings; but it seems perfectly plain that they had been taught by heredity that their safety depended upon their remaining still, and they had no idea of any change of conditions.† It might be argued that in twenty years the survival of the habit of remaining still for protection would have been so

* R. Kearton ('Nature and a Camera,' p. 176) narrates a practice of the Hare which he well describes as "like a reasoned action deliberately executed to mislead prowling enemies that track them by the scent left in their foot-prints."—ED.

† A Woodcock has been observed to reason under such conditions. Mr. F. M. Chapman, of the American Museum of Natural History, New York, in a lecture on 'Birds in Nature,' remarks:—"That the Woodcock appreciates the value of its costume of brown and black is, he thinks, fairly proved by the experience of a friend of his. Early one spring morning he found a nest of this species occupied by one of the birds. Approaching the bird cautiously, he managed to stroke its plumage without its taking fright, so great was its faith in its protective colours. He also succeeded in taking a photograph of the bird, placing the camera a few feet from it. Focussing was accomplished with difficulty, and only by using the eye of the bird as a focal point. The picture is a veritable puzzle. The bird is invisible to most eyes, though plain enough when once distinguished. While the bird was sitting a slight snow fell. The brown leaves which before had aided its concealment were now covered with a white mantle, and the bird became a conspicuous dark object against this snowy background. It now had no confidence whatever in its colouring, and took wing as soon as a person appeared on its horizon."—ED.

detrimental to the Hares that either they would have been exterminated by their natural enemies, or that natural selection, through the instrumentality of their enemies, would have caused them to adopt the more protective summer dress much earlier. But it must be taken into consideration that these Grouse-moors are most strictly preserved, and that all the large predaceous birds and carnivorous animals are destroyed whenever they appear. Foxes are trapped in large numbers, and there are hardly any large Hawks. Thus the action of natural selection in regard to colouration is practically annulled, and there is nothing to influence any change. This is a clear case of what Mr. Marshall speaks about on p. 542, an "observation of the demeanour of protectively coloured animals, which find themselves, by natural accident or necessity, in an environment to which their colour is quite unsuited"; and the animals have not altered their habits, but adopted "their usual attitudes of concealment," and it appears to be an unmistakable example of "unreasoning instinct."

It was interesting to note how the Hares escaped when we got so close that they came to the conclusion that they were observed. Out of nine that we bolted, two ran into crevices in the rocks, two ran along the side of the hill, and five went straight uphill at a great pace. The visibility of the Hares may be understood from a remark in a letter from the late Col. Crompton Lees. He tells us that on his moors at Greenfield, Yorkshire, in March, 1893, his keeper from one spot on the hills counted over fifty Hares within range of his field-glass at one time.—T. A. COWARD (Bowdon, Cheshire).

NOTICES OF NEW BOOKS.

British Flies. Vol. VIII. By G. H. VERRALL.
Gurney & Jackson.

THIS is the first of fourteen volumes on the British Diptera, in which Mr. Verrall proposes to describe and illustrate a very much neglected order of our insular insects. In writing his first volume, he has already helped to fill a gap which existed on the shelves containing the publications on the Natural History of Britain.

This volume commences the series devoted to the Diptera Cyclorrhapha, and describes the Platypezidæ, Pipunculidæ, and Syrphidæ. It is not a compilation, and for the very best reasons: firstly, the antecedent publication is too small for the purpose; and secondly, it is the result and condensation of some thirty years' collecting and observation. It mostly follows the best traditions of monographic productions, although on many points Mr. Verrall is a law unto himself. Thus the synonymy of the genera and species has been deferred to a catalogue at the end of the volume, though the author's synonymical criticisms are appended to his descriptions of the species. We are, perhaps, old-fashioned, but we like this course as little as the sometime practice of discarding footnotes, and placing such references in the same position as Mr. Verrall's synonymical records are to be found.

The author's descriptions of the species are ample, concise, and clear, and if his views recently expressed in a presidential address—that all insufficient descriptions should be discarded—are to be followed, then, as a logical correlation, the name of Verrall should in justice be applied as the parent name to many of these species. But we do not think this is likely to take place; all reforms are only partial; you may shift, but you cannot abolish, the vested interest. In nomenclature there is no

finality. Its vicissitudes represent the phases of current opinion. We may change names to-day, and posterity will probably religiously restore them. Even the binomial nomenclature of Linnæus only exists because we cannot at present imagine a better procedure—and this is the highest praise that can be given to any system or proposition.

This volume, however, represents much more than a discussion on nomenclature or a taxonomical digression. It is the descriptive history to date of a portion of the two-winged flies (Diptera) found in Britain, the general knowledge of which, it may be said, will date from the time of this publication. It is a work which is written in a calm, judicial spirit, and leaves the problems of evolution alone; it describes the insects as they are, and does not discuss the question why they should be so. Perhaps we need not regret this course, for to-day there seem more writers on the last subject than there are who can describe present appearances. A portrait of Meigen is supplied as a frontispiece to this welcome addition to the publications on the Zoology of our own country.

The Mammals of South Africa. By W. L. SCLATER, M.A., F.Z.S.
Vol. I. Primates, Carnivora, and Ungulata. R. H. Porter.

THIS is the second volume of the series devoted to the Fauna of South Africa; the first, relating to Birds, was noticed in the 'Zoologist' for 1900.

The mammals of this region, especially those belonging to the order Ungulata, are sufficient to inspire the pen of any naturalist; no area ever possessed more rich and wonderful herds of game than those which once roamed over its plains, now alas! sadly diminished in numbers, with its erstwhile Blaaubok and Quagga reported as absolutely extinct. We have only to read the narratives of the old travellers—Mr. Sclater has prefaced his volume with an excellent bibliography—and to compare their accounts of mammalian life with its diminished aspect to-day, to realise how man is after all the most destructive animal on the planet. But in South Africa it is not the sportsman so much as the trader who hath wrought this havoc, though it is often difficult to separate the one from the other.

The Primates occupy but a small part of the work, as they are very few in number, for although, as the author remarks, "this order comprises Man, the Monkeys, and the Lemurs," we have not yet reached a comprehensive treatment of the order in one publication, and Man still has an anthropological treatment all alone, as befits the "lord of the creation."

The Carnivora, by the presence of the African Lion, becomes an order of importance in this region. The animal is not now found south of the Orange River, but is still a denizen of many parts of the wooded Transvaal; and the writer of this notice has within the last decade seen many a skin brought in by the Boers for sale on the Pretoria market. It is, however, in the descriptions and details of the *Viverridæ* that this book will prove a perfect boon to all those who take an interest in the animal life of South Africa, a class likely to be largely augmented in numbers in the very near future. The Aard Wolf (*Proteles cristatus*), which enjoys an insectivorous diet, is now reported to have acquired a habit, like the Baboon, of attacking kids and lambs.

When we come to the Ungulata, we approach an almost vanishing race. The Blaaubok and Quagga are gone, and to anyone conversant with the number of Zebra hides which can be purchased in the season at Lourenço Marques, it is apparent that that animal must be making a struggle for continued existence in South-east Africa. The present writer, a few years ago, could have purchased some eight hundred game hides at Delagoa Bay, the greater portion of which were Zebras', and all killed in one season. This quantity was for sale by one firm alone! It is painful in reading the book to meet with so many fine animals now only represented by preserved and localised individuals. The Black Wildebeest (*Connochætes gnu*) "is now practically extinct in a true feral condition"; the Eland (*Taurotragus oryx*), which was "formerly found all over South Africa, including the Colony," is still found a few at a time in some favourite localities; "elsewhere they have been nearly exterminated." But it is needless to dwell on a too well-known fact.

This volume should form part of the equipment of any proposed emigrant to South Africa who is prepared to look at nature other than exhibited by a metalliferous reef. Its value is felt by

those of us who were once there, but without a publication like the present, which would have supplied a long-felt want. We trust that Mr. Selater will soon produce his second volume.

The Crocodilians, Lizards, and Snakes of North America. By EDWARD DRINKER COPE, A.M., Ph.D. Ann. Rept. Smithsonian Institution, 1898 (1900). Washington: Government Printing Office.

THE principal portion of the pages of this last report—just received—is occupied by a posthumous communication by the late Dr. Cope, which extends over one thousand pages, is fully illustrated, and is a worthy legacy by a great palæontologist and evolutionist now no longer with us. As is well known, Dr. Cope held his own views on evolution, and was neither swayed by modern theories, nor influenced by opinions which had obtained a present currency but not necessarily the assurance of a future canonization. It is not our province to advocate his evolutionary views; it is, however, our duty to more or less express them. In this treatise they are not too pronounced, and may be found in his preface. In these days, when it is the vogue to express generic resemblances as always due to the phenomenon of mimicry, it is perhaps well to remember that the explanation is at least of not universal acceptance. Thus Dr. Cope writes:—"I long since pointed out that generic characters may, and in fact generally do, arise in the process of evolution quite independently of the specific, so that certain species of different genera resemble each other in the so-called "natural," that is, specific characters, more than they do other species of their own genus. . . . It is not, then, remarkable that sometimes one or more species of two or more genera should parallel each other."

It would, however, be a misrepresentation to lead a reader or student to suppose that this publication is of a speculative character. It is, on the contrary, a very fully descriptive monograph on the Crocodilians, Lizards, and Snakes of North America, in which the taxonomic features far exceed the bionomic details, and absolutely supplant theoretic speculations. It is, however, rare to find any zoological publication without some information that supports or minimises some evolutionary conceptions.

This contribution makes the last Smithsonian Report a notable publication.

Lord Lilford: a Memoir, by his Sister. Smith, Elder & Co.

THIS is not to be considered a full biography, especially from the ornithological standpoint; it is the worthy tribute of a sister to the memory of a naturalist brother, and "to keep such a memory alive in the family to which he belonged." Lord Lilford must have had an unique and lovable personality, which impressed, amongst others, the late Bishop of London, who wrote an introduction to the volume, and who bore this witness:—"To me he was a man of remarkable attainments and singular charm, a man whom to know was a life-long possession." The limitations and compensations of his existence are fully set forth, and yet we rise from the perusal of the volume with the opinion that his life was, on the whole, a happy one. There were shadows, but not sufficient to quench a sunlight that pervades the letters which occupy the larger portion of the book.

There can be no doubt, as we read these pages, that Lord Lilford was not only an ornithologist at heart, but possessed a desire to do all in his power to further the interests of the science. His "Coloured Figures of the Birds of the British Islands" is a publication which will prove a permanent monument to his memory, whilst his collection of living birds must have afforded a zoological lesson. The accident of high social position, with its wealth and leisure, he abundantly proved could be made a dominant factor in the study of nature, and we feel that the only discordant chord in the whole of a most charming and genial narrative is a quotation from the letter of the rector of the local living, who, speaking of the universal grief at the death of Lord Lilford, remarks, "Even the Radical papers have kindly notices." Why not? Surely politics are outside Zoology, and are largely the creation of environment. We neither particularly want to see Radical Peers nor Tory village artisans, the sense of proportion is a charm in life. But the subject of this memoir is outside these narrow restrictions; judged as an ornithologist by naturalists, or by the "abiding power of character," as expressed by the late Bishop, he strikes a deeper sympathy than can be expressed in the terms of a parliamentary jargon.

THE ZOOLOGIST

No. 717.—March, 1901.

NOTES ON THE SEAL AND WHALE FISHERY OF 1900.

BY THOMAS SOUTHWELL, F.Z.S.

THE unusually mild winter of 1899–1900, and the consequent absence of ice in the bays on the east coast, led to the prediction that the past season would be a very favourable one for the sealing fleets, both in the Gulf of St. Lawrence and off the east of Newfoundland. This has been amply verified, and the take was the largest which I have had to record in my notes, now extending over twenty consecutive years. Other circumstances have also been in favour of the venture, and with the increased value of produce the past season must be regarded as quite a record one.

The steam sealing-fleet of the year 1900 consisted of nineteen vessels—the ‘Esquimaux’ of Dundee having been added—eleven of which cleared from St. John’s, one from Bay Roberts, three from Greenspond, and four from Channel (Port au Basques)—the latter for the Gulf fishery—all sailing, as usual, on the 10th of March.

By Monday the 12th the Seals were found covering a vast field of level ice about forty-five miles N. by E. of the Funks, and extending over a circuit of some thirty miles, the number being very large, and the ice-field was so easily approached that all the vessels could reach its occupants readily, and lie in close

proximity to them. The killing commenced at once, and vast numbers were "panned," many of which, as usual, were never seen again, at least by those who killed them. Bad weather and fogs came on, the vessels being separated from their panned Seals; and there were nasty rumours of misappropriation by certain of the crews, which led to subsequent unpleasant litigation—an event, be it said, happily of rare occurrence.

The young Seals were in excellent condition, and were rapidly being got on board, but unfortunately a change took place before the work was completed, and stormy weather, accompanied by dense fogs, first delayed the vessels, and then rendered their passage home in their heavily laden condition very perilous. Notwithstanding this, however, four of them were in port with large cargoes by the 27th, and others followed in quick succession. The 'Diana,' the last of the St. John's steamers to arrive, was the only one which missed the main body of the young Seals off the east coast, but she succeeded in picking up over 2000 young Harps, and then went to the neighbourhood of Groais Island, some thirty miles east of which she killed about 8500 old and Bedlamers Seals, and over 500 old and young Hoods. The old Seals were all "batted," and during their collection the 'Diana' drifted south with the floe to the neighbourhood of Funk Island.

This was the only considerable number of over-year Seals killed by any of the vessels, with the exception of the 'Vanguard,' which had 2700, and the 'Nimrod' 5200, the latter having been unsuccessful at the Gulf fishery.

Of the four vessels which went to the Gulf of St. Lawrence, the 'Nimrod,' as just mentioned, met with no success in that locality, but, going north through the Strait of Belle Isle, made up her catch of 5546 (mostly old Harps and Bedlamers) between Groais Island and Funk Island. The 'Harlaw' and the 'Hope' got well among the western Harps, and secured good catches of young Seals; but the 'Kite' was very unfortunate. Being unable to reach the western Harps, Capt. Young steered north-east in search of the Hooded Seals, with little better success, there being no ice suitable for them to whelp on; the result was that they took to the standing ice between the Island of Anticosti and the shore, and, drift ice coming in, rendered it im-

possible for the vessel to reach them. 271 young and 181 old Hoods were the only reward for a very arduous voyage.

The total number of Seals brought in by the fleet of nineteen steamers, of the aggregate register of 6053 tons, and manned by crews numbering 3760 men, was 353,276 (against 268,787 in the previous season), of an estimated net value of £96,720 (against £68,527 in 1899). To these must be added some 10,000 taken by the schooners and by the inhabitants of the Magdalene Islands, which would bring the value of the produce up to nearly £100,000. This was very equally distributed, all but three or four of the vessels making paying voyages, and the majority doing exceedingly well. The 'Neptune' took the lead with 36,255 Seals, followed closely by the 'Terra Nova' and the 'Aurora,' with more than 32,000 each; eight others had over 15,000 each, and five more above 10,000; the 'Kite,' for the reasons already named, brought in the produce of 452 Hooded Seals only. The average of the whole nineteen vessels was 18,594, eleven of them having cargoes above that average, and eight below it. The price of produce was fairly remunerative, oil fetching, say, £23 per tun; and Mr. Thorburn tells me that a new market has been found for oil in Italy, which promises to be of great assistance to the sealing industry. No casualty has been reported to mar the success of the voyage.

In the ten years, 1871 to 1880, inclusive, 218 vessels killed 2,434,063 Seals, and in the decade, 1891 to 1900, there fell to the lot of 181 vessels 2,422,125 of these animals. But these enormous numbers by no means represent the whole reckoning, for they are only the produce of the steam fleet, and do not include (i) those killed and lost on the ice, (ii) those taken by the schooners, or (iii) those killed from the shore, or on the Labrador coast. Even the total number of skins exported from Newfoundland would not give the exact number killed, for they would not include the first mentioned shrinkage, and I have not the full statistics of the two periods at hand; but my object in making the comparison was to ascertain, if possible, what effect this enormous destruction of the old and young Seals has had upon the numbers frequenting the ice-floes of the North Atlantic in the breeding season. The result is rather surprising, for it will be seen that in the first period the catches averaged 11,165 per

vessel, and in the last 13,382, showing an increased yield instead of a falling off, as might have been expected. In the first period, too, many of the vessels made second, and some even third trips. In spite of the number killed by man and by natural causes, a goodly residue must escape annually (sometimes when the season is unfavourable to the sealers a large proportion) to continue the species, notwithstanding all the dangers to which they are liable.

Mr. Thorburn has been kind enough to obtain for me the following information with regard to the doings of the Cabot Whale-fishing Company, which is useful as indicating the seasonal movements of the cetaceans named :—

The 'Cabot' left St. John's on Nov. 1st, 1899, for Hermitage Bay, and commenced fishing in that neighbourhood on Dec. 1st. She killed five "Sulphur-bottoms" before the end of the year; in January she got four others, and in February three; in March seven, and in April five; in May seventeen. In April she killed her first "Humpback," and in May five others, as well as four "Finbacks"—in all, fifty-one Whales. When this information was received she was on the point of leaving her winter fishing-ground, and going north, probably to Green Bay, where during the summer the last two species mentioned above are found. The fifty-one Whales yielded 250 tons of oil, which is this year worth £20 per ton, and the seven Sulphur-bottoms about a ton of whalebone over one foot long, which is known as payable bone, but is of poor quality.

Just twenty years having passed since I contributed the first of these annual notes on the Seal and Whale Fishery to the 'Proceedings' of the Glasgow Natural History Society (the nineteen which have followed are in the consecutive volumes of 'The Zoologist'), and great changes having taken place in that time, especially in the Whale-fishery, to which we have now to refer, it may not be amiss to contrast the season of 1881 with that which has just passed; and, as the condition of the ice to a very large extent rules the success or otherwise of both industries, more especially that of the Whale-fishery, I shall first refer to the great contrast which exists in that respect between the two periods.

The year 1881 was as remarkable for what is known as a

“south-ice year,” as that of 1900 has been for the absence in the Greenland Seas of this indispensable shelter both for the Right Whale and for the breeding Seals. The year first named seems to have been the culminating point of a series of south and east ice years; there had been very little southerly drift, and one vast ice-field extended in the months of April and May from the east point of Iceland in a north-easterly direction to Bear Island, where it made a sharp bend to the E.S.E., extending to within $2\frac{1}{2}^{\circ}$ of the North Cape. When Capt. David Gray in the ‘Eclipse’ entered the ice, on May 23rd, he had to bore his way through three hundred miles of that obstruction before he reached the “land-water” of Spitzbergen, where the Whales are first looked for. Of course, under these conditions, the east coast of Greenland was utterly unapproachable, and it was equally useless to attempt to penetrate to the then all but unknown Franz Josef Land. Of late years both these regions have been accessible every year, and the latter mysterious archipelago has been repeatedly visited, wintered in, and to a large extent mapped; but in the year 1886 the ice was so heavy in the usual summer fishing-ground off the Greenland coast, that Capt. David Gray, as an alternative, made an attempt to reach the Franz Josef Land waters, hoping to explore that region in search of Right Whales (which subsequent experience has proved do not extend their wanderings so far to the eastward), but was stopped by the impassable ice in 75° N. lat., $36^{\circ} 44'$ east longitude. In 1898, so changed was the condition of the ice, that Dr. Nathrost was able to reach White Island, as well as the mysterious Wyche’s Island, and performed the feat of circumnavigating the whole of Spitzbergen in a single season; whilst to the westward the east coast of Greenland has been approachable for the last few years. In the past season Prof. Kolthoff was enabled to follow the coast from Cape Broer Ruys to Pendulum Island; and the captain of the Norwegian whaler ‘Cecilie Malene’ took his vessel as high as $75^{\circ} 30'$ N. latitude, a point further north than is positively known to have been previously reached by a ship.* Lieut. Amdrup’s expedition to the same coast passed through the ice barrier on July 6th, 1900, in lat. $74^{\circ} 30'$ N., $30^{\circ} 58'$ W. longitude, and from the vessel or by boat

* Geogr. Journ. Nov. 1900, p. 567.

he mapped the coast southward to Tasiusak in $65^{\circ} 35'$ N. latitude.* There are, however, indications that a change is taking place. The Norwegian Walrus-hunter 'Hertha' found the ice very heavy in the past season on the coast of Franz Josef Land, and was unable to reach Cape Flora. The 'Stella Polaris' also experienced similar difficulties in the same seas; and, as will be seen, the west coast of Spitzbergen was encumbered with heavy ice, forming a great contrast to the open condition of the Greenland coast. But here also Capt. Robertson reports that the ice was accumulating, and the prevailing winds were easterly up to the time of his departing for Davis Strait on June 10th. A stoppage of the southerly drift, especially if accompanied by severe frosts cementing the pack together, would rapidly restore the normal condition of the ice, and the Greenland coast, as well as the seas to the east of Bear Island, would again be rendered unapproachable.

Now, when we consider that the presence of ice sufficiently heavy, although not too close, upon their feeding-grounds in about 75° to 79° N. latitude in the meridian of Greenwich, and again in about 73° N. and 13° W. longitude, is an absolute necessity for the well-being of the Right Whale, and that the Harp Seals haul up to whelp on the heavy ice usually found in certain well-known localities to the north-east of Jan Mayen, there seems little room for surprise that in the altered conditions which have prevailed of late years there should have been such a marked absence of both these animals. It is a question what has become of the Right Whales which formerly so abounded in the Greenland Seas: have they been totally fished out, or have

* *L. c.* p. 663.—The expedition met with Musk Oxen in abundance in the neighbourhood of Scoresby's Sound, and brought home one calf alive, in order to secure which, it is said, a herd of fourteen were shot down. Later on a second calf, which did not live, was obtained by the same costly process. The Walrus-hunters also brought home fourteen young ones alive; one yearling male was sent to the Hamburg Zoological Gardens, and five to Antwerp; but three of the latter died in transit. As a writer in the 'Field' of Oct. 20th observes, "it would be interesting to know how many of these harmless animals were shot down by the Norwegian hunters this season to enable them to capture the fourteen calves?" It is evident that the sooner the ice closes again on the Greenland coast, the better will be the chance of the survival of this interesting animal in that locality.

they abandoned quarters which have become unsuitable, for others more in accordance with their requirements, and, if the latter, where have they betaken themselves to? When we consider the vast extent of these seas, and the increased wariness of the animals brought about by constant disturbances, it seems highly improbable that the last Whale has been found and killed in this trackless ocean. Surely a remnant must have been left had they not deserted their former habitat of their own accord. But where can they have migrated to? There seems to be an abundance of Whales on the west side of Greenland in Davis Strait, and were it not that a passage round the north of Greenland into Robeson and Kennedy Channels (where they have never been seen) is rendered impossible, as they would undoubtedly perish, suffocated under the unbroken fields of fixed ice, and that they have not been known to pass south of Cape Farewell (there being no other apparent communication between the two seas), it might readily be supposed that they had joined their brethren in the locality above mentioned; but, so far as can be ascertained, such a change of location is an impossibility, and the only certainty is that the conditions necessary to their requirements have of late years greatly changed for the worse, and that the Whales themselves have disappeared—whether permanently or not, who can say?

As to the Seals, the case is much more simple: the destruction year after year of a very large proportion, often virtually of the whole brood and of a large number of old Seals in addition, congregated in a limited area, must inevitably tell in course of time, and sooner or later reduce the breeding pack to such an extent that they would be no longer worth pursuing, and even lead to their final extermination. This has doubtless to a very large extent been the case. The British vessels have quite abandoned the pursuit, and what there is left of the Greenland sealing is now quite in the hands of the Scandinavians, whose more economical outfits enable them to continue the struggle long after we have been driven from the field.

In the year 1881 Dundee sent out fifteen vessels, and Peterhead five. Nine of the Dundee vessels and five of those from Peterhead took part in the Greenland sealing, killing between them 23,984 of these animals. The other six Dundee ships went

to Newfoundland, where they captured 139,985 more Seals, making a total of 163,969 in all, before they turned their attention to the Whales. This branch of the fishery was pursued by twelve of the Dundee vessels in Davis Strait, with a result of 48 Right Whales; two others fished for Bottlenose Whales in the Greenland Seas, capturing 22. Four of the Peterhead whalers which gave their chief attention to the Greenland Bottlenose Whales killed 94 of these and 23 Right Whales, making a total return of 163,969 Seals, 71 Right Whales, 116 Bottlenoses, and 33 tons 6 cwt. of bone. Compare this with the past season's catch, as stated farther on, and with the fact that in 1897 one Whale was captured, and one other seen; in 1898 not a single Whale was seen; in 1899 one Whale was seen and captured; but in the past season of 1900 a diligent search in the Greenland fishing-grounds, extending over six weeks, did not reveal the presence of a single Whale. In those days we hear nothing of such small deer as Bears and Walruses, which were treated as by-products.

But it is time to speak of the voyage of the past season. The 'Balæna,' the only vessel which went to Greenland, after her unsuccessful search in that locality, departed on June 10th for Davis Strait; but it was not till Sept. 20th that she killed her first and only Whale, having the misfortune to lose a second to which she fastened. Capt. Roberts reports that in the fall a large number of Whales were sighted, but that, owing to almost incessant gales of wind, it was impossible to send out the boats; and this seems to have been the experience of all the vessels so far as weather was concerned. The 'Balæna' brought home 21 tuns of oil and 14 cwt. of bone, the produce of the one Whale, and 91 Walruses, also 18 Bears.

The 'Eclipse' had a very arduous time, and it was not till Sept. 19th that she killed her first Whale, although plenty were seen; on the 23rd she captured another, and a third on Oct. 10th. This last proved a fighter from the first, and, after smashing one of the boats—fortunately no lives were lost—required two explosive rockets before it succumbed. The voyage home was no exception as to weather, and the 'Eclipse' arrived in a very battered condition, but with three very fine Whales of 10 ft. 5 in., 11 ft. 6 in., and 12 ft. 3 in. bone respectively, which

yielded 46 tuns of oil and 60 cwt. of bone, the latter largely in excess of the average, as is generally the case with very large Whales, the ordinary proportion being about 1 cwt. of bone to each tun of oil.

The 'Esquimaux,' after returning from Newfoundland, as already stated, proceeded to Davis Strait, where she killed her first Whale in Pond's Bay on July 9th, and a second on the day following. On the 14th of the same month a larger Whale was killed, but it was not till Sept. 23rd that another was harpooned. This was in Coutts Inlet; but it unfortunately broke away, carrying with it three hundred fathoms of line. Thereafter the weather was too stormy for fishing, and the 'Esquimaux' returned with three small Whales, yielding 20 tuns of oil and 20 cwt. of bone. This, with the sealing venture, constituted a very fair season's return.

The 'Diana' was the most fortunate vessel of the fleet. During May fifty-four Walruses were secured at the south-west fishing; on July 7th she killed her first Whale, and before the end of the month she had two others on board. A fourth was killed in Coutts Inlet on Sept. 9th, and two others on the 23rd of the same month. After encountering frightful weather, the 'Diana' arrived at Dundee with 6 Whales, 54 Walruses, and 24 Bears—yielding $76\frac{1}{2}$ tuns of oil and 77 cwt. of bone.

The 'Nova Zembla' killed her first Whale in Coutts Inlet on Aug. 11th—a fine fish of 11 ft. bone—and on the 23rd of the same month an even finer fish of 12 ft. bone; but a third to which she fastened unfortunately broke away, and was lost. Her catch was 2 Whales, 12 Walruses, and 4 Bears—producing $38\frac{1}{2}$ tuns of oil and 41 cwt. of bone.

The 'Active' visited the station in Hudson Strait (see Zool. 1900, p. 71), where she found all well. One small Whale had been killed on June 10th, also a number of Walruses and Bears. In all she brought back with her 28 tuns of oil, 7 cwt. of bone, 327 Walruses, and 76 Bears.

The season of 1900 will long be remembered by the Davis Strait whalers as one of the most stormy within the experience of the oldest hands, and this was rendered the more tantalising from the fact that fish were in plenty; but it was impossible to send the boats away, and even when this could be done the ice hampered their movements, or enabled the Whales to escape.

The result of the season's fishing was 16 Whales, 494 Walruses, 53 Seals, and 145 Bears, producing 230 tuns of oil and 219 cwt. of bone; in addition to which was the produce of one Whale, 138 Walruses, and 3400 Seals, equal to 60 tuns of oil and 10 cwt. of bone, brought home from the Cumberland Gulf station by the Peterhead brig 'Alert.' No White Whales were killed, owing to the bays in which they are usually beached being blocked with ice.

The present price of oil is £22 per tun, and of size bone £1400 per ton. The Walrus hides vary greatly in value according to quality—*i. e.* thickness—and the Seal-skins may be taken all round at 3s. each. At this rate the estimated value of the year's produce would be something like £30,000, as against £38,000 in the previous season.

I am informed that, so far as the British whalers are concerned, the Greenland Seas will be left undisturbed in the coming season.

I have to express my thanks to Mr. James Mitchell and Mr. R. Kinnes, of Dundee, for kindly furnishing me with information with regard to the Dundee whaling-fleet; and to Mr. Michael Thorburn, of St. John's, Newfoundland, for like favours from that port.

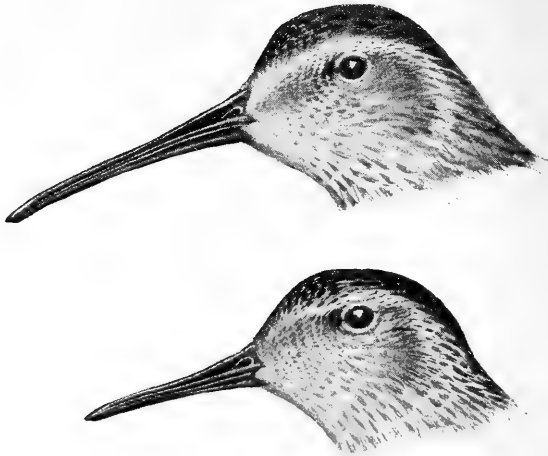
VARIETIES OF THE DUNLIN.

BY J. BACKHOUSE.

FOR several years past, when observing birds on the coast of Yorkshire, the writer has taken particular notice of what may be looked upon as our commonest Wader—the Dunlin. He has also seen the species repeatedly at its breeding haunts upon some of the highest Yorkshire “Fells,” and now ventures to offer a few remarks upon the subject for the benefit of those who, like himself, know and can appreciate these common and often despised little birds wherever they meet with them. That two remarkably distinct races of the Dunlin regularly occur in Yorkshire is a fact realised by ornithologists, and by those who are habitual gunners on our coasts. The one is a strongly built bird, with long straight bill, and wings some $4\frac{3}{4}$ in. in length, found in enormous flocks, often congregating with other Waders; the other is a smaller, slighter built bird, with a shorter and straighter bill, and a decidedly shorter wing-measurement.

The latter bird is more solitary in its ways, and, as the late Mr. John Cordeaux points out, “differs from the more common species in resorting to the borders of the marsh-drains, or to the ‘fittie-land’ adjoining the ‘muds,’ in preference to the flats, and is remarkable for its extreme tameness, permitting a very close approach.” This small Dunlin was described by Brehm, under the distinctive title *Tringa schinzii*, as early as 1822, and, as compared with certain other so-called *species*, is equally worthy of a separate designation to-day; for, although mere relative measurements of bill or wing may not of *themselves* be looked upon as sufficient to differentiate the two forms specifically, there are other reasons why the question should, we think, be reconsidered. The following illustration showing the typical heads of the respective forms is here given, in the hope that it may prove useful as showing *the general pose of the bill* in each case.

It is somewhat remarkable, that whereas the Dunlin seldom, if ever, exhibits any *violent* variation in its plumage, such as a tendency to melanism or albinism, in the smaller race alluded to we have a constant and well-marked variation from the type.



The Dunlin.—Larger and smaller forms.

Neither the late Mr. Cordeaux nor Mr. Oxley Grabham—both of whom have had practically a life-long acquaintance with the Dunlin—have known any such *violent* variations as are just alluded to; nothing more, in fact, than the great variation in overall markings, which presumably gave rise to the name of *Tringa variabilis*, as applied by Bechstein and others.

Some time ago, while collecting on the Yorkshire coast, a heavy shot brought down some Knot (buff-breasted), several Dunlin, many of them in exceedingly beautiful breeding plumage (thanks to the lateness of the season), and also a solitary example of the “drain Dunlin,” which so closely resembled the Little Stint as to be mistaken at the moment for that species. The markings of the back especially, coupled with the short measurement of bill and wings, almost suggested a possible case of hybridity; such, however, we feel sure, is not the case, but the specimen in question was Brehm’s *T. schinzii* pure and simple.

The following list shows the comparative dimensions of

several specimens of both larger and smaller races in the writer's collection :—

SMALLER FORM.		
	Bill.	Wings.
♂ Spurn, 1898	0·99	4·1
♂ Dunn Fell, 1884	1·1	4·2
♀ „ „	1·2	4·3
♂ Teesdale, 1886	0·99	4·15
♀ „ „	1·0	4·2
Juvenile, Teesdale, 1882	1·05	4·2
Adult, Ramsgill, 1886	1·2	4·5
Juvenile ♀ Ramsgill, 1886 ...	1·2	4·3

LARGER FORM.		
Adult, Helmsley, 1891	1·35	4·65
♂ Spurn, 1887	1·3	4·65
♀ „ 1882	1·3	4·6
♀ „ 1887	1·3	4·55
♀ „ 1884	1·4	4·75
♂ „ 1887	1·27	4·55

In the foregoing lists it will be at once noticed that all the large birds are from the sea-coast; and, oddly enough, among several specimens before us, collected on the North of England “fells” during the summer-time, not a single example of the larger billed bird is to be found, nor can we recollect having seen any but the smaller race upon these “fells.” The question then seems to resolve itself, first of all, into a distributional one as to the breeding of the two forms; that point settled, we shall surely come one step nearer to a satisfactory basis upon which to establish the validity or otherwise of *Tringa schinzii* as a species. The writer has now been fortunate in discovering what may well be looked upon as “headquarters” for Yorkshire breeding Dunlin, and it is to be hoped that during the coming season careful observation can be made upon a large number of nesting birds.

Meantime the evidence of two well-known north-country ornithologists must now be given as bearing in an important manner upon the subject at issue.

In a letter, dated Jan. 30th, 1899, Mr. Harvie-Brown writes as follows:—“The short, straight-billed form breeds very abundantly in the Outer Hebrides; also in Tiree and elsewhere in the west and north, where I have taken their eggs. Here also, within five miles of this house (Larbert, Stirlingshire), in two

localities, the short-billed form is found nesting; I had their eggs here several seasons, and can always go to their nesting-ground any season. In Sutherlandshire I have taken a few Dunlins' eggs. The birds appeared to me to be larger than the Hebridean birds, but not so large as others which I have shot on the Firth of Forth, where, however, I have, during the prevalence or after a sharp change of wind, also shot the small form. If we have an east wind blowing at Grangemouth, or between that and Kincardine, which continues any length of time, our coast becomes *bared* of almost all the *big flocks of Dunlins*. But at such times *small* trips of perhaps two, three, four to six may be seen, and these are almost invariably the small short-billed birds. Or if a west wind has prevailed for long (and that is our best wind for shooting the shore-birds on our coast) immense flocks of Dunlins are found—thousands strong; on one occasion I fired two barrels into a huge flock upon Grangemouth breakwater, . . . and picked up sixty-seven; . . . but of *all these* not one was a short-billed bird. But if the wind suddenly went round from west to east, these big flocks flew right away across to the Fife shore; and if the wind continued twenty-four hours in the east, then we would begin to pick up the short-billed birds, apparently in family parties. My own belief is that these birds come across from 'Clyde' to 'Forth,' with (or rather *against*) the change of wind."

Again, in a letter from Dumfries, Mr. Robert Service states: "A good many pairs nest along the merse-lands west of Southerness Point, and these certainly belong to the small-bodied and short-billed race, if race it be. I always think their summer plumage is not so deep or bright as the others that, at that time, are still flying along the sands in great flocks, and that even till the end of May are to be seen or heard flying northward to further breeding quarters."

A FEW FURTHER NOTES ON THE GREAT SPOTTED WOODPECKER (*DENDROCOPUS MAJOR*).

BY OLIVER H. NEW.

I HAVE already recorded an observation on this bird in 'The Zoologist' (1900, p. 278), and, having made some further notes from personal observations, which may be of interest, I propose to set them out in detail.

The previous note was made on May 15th, and during the remainder of that month I was frequently able to watch the tapping process, and to confirm the theory of its being used as a call between these birds. I found that the tone of the note never varied appreciably when the same bough was made use of, and, although I discovered the bird tapping on other trees on two occasions, yet the dead pine-bough mentioned in my former note was evidently the favourite place, owing to its proving so excellent a sounding-board. At a distance of some fifty or sixty yards from this pine-tree stood a partially dead beech-tree, and at a height of twelve feet or thereabouts from the ground, in the face of the trunk, I observed a freshly made hole, beneath which chips of dry wood were scattered on the ground. Suspecting that my friends *D. major* were responsible for this hole, I kept a sharp look-out, with the result that on several occasions, as I approached the tree, I saw one of these birds hurriedly leave it, and fly away to a distance. I soon discovered that, with these birds, owing to their extreme shyness and marvellous keenness in sight, it was impossible to make further observations without my being concealed, and consequently I took up a position (May 23rd) behind the lower branches of a beech-tree, at a distance of five or six yards from the hole, of which I had an excellent view.

After waiting for a quarter of an hour, at 5.30 p.m., the male bird flew to the tree, and settled on a dead bough just above the hole. He executed a series of comical sideway jumps, at the same time peering about him cautiously, eventually tapping gently with his beak upon the branch on which he was perching;

but this produced very little sound, and he soon gave it up and flew away.

After about ten minutes both male and female birds appeared, and danced about on the trunk and the branches of the tree close to the hole, their antics being most amusing to watch. Presently the female bird perched upon a horizontal branch slightly below the level of my line of vision, and I actually observed the male bird tread her for some seconds. During this operation the male bird balanced himself by keeping both wings fully extended, and I obtained a particularly fine view of the outline of the wings and their beautiful markings. Fortunately my ambush proved an excellent one, and my presence was entirely unsuspected, although I was so close to the birds that I hardly had occasion to use my glasses. I was particularly impressed by the fact that both birds constantly uttered the peculiar soft twittering notes I had previously described—a kind of whispered sound of pleasure and satisfaction, as it were, to one another, which was most pleasing to the ear; while they never once gave utterance to their somewhat harsh, laughing, almost Owl-like cry.

Two days later I took up my position again at 7 a.m., and, after watching nearly half an hour, was amply rewarded, as both birds at length appeared. The male went inside the hole, and disappeared from view; but presently his head appeared, and a beakful of chips of wood was thrown from the nest and scattered on the ground. He worked away busily, and it was interesting to observe the curious jerk he gave to his head as he disposed of each beakful.

Sometimes one and sometimes both birds were on the tree, but the female appeared to do no work. When alone she perched perpendicularly on the tree-trunk, and peered into the hole; then she went inside and peered out; the next minute she was out again, and was apparently testing the hole by going in and out repeatedly, making a careful inspection of her future home both inside and out. On the two following days I again watched the male bird tapping on his pine-wood sounding-board, and was struck by the fact that the interval between each series of taps was longer than when I had first observed it earlier in the month. Another curious thing was that a final tap was added separately, as though one had been forgotten. After this the tapping was

seldom, if ever, heard at all, which I attribute to the fact that the birds were then nesting, and that there was no further need for this method of attracting attention. I was unable to definitely satisfy myself that the tapping is done by the male bird only, but strongly incline to the view that it is so, as I never observed the female make use of this signal. I am not aware how far previous observers have confirmed this theory, and shall be interested to know what others may have to say in reference to it.

The last day upon which I have any note of hearing this tapping is May 27th, and, indeed, after that date I failed to make any observations of interest. I cannot say positively whether eggs were laid in the nest or not, for I have a great dislike to disturbing birds in any way; while, owing to absence from home during June, I was unable to discover whether a family appeared or not. The sequel to my story is, however, of considerable interest. On the night of Monday, Aug. 6th, the tree in which the nest was made was blown to the ground.

I was fortunate enough to obtain permission to cut a section from the trunk containing the Woodpecker's hole, and, after sawing through the tree in two places, managed to take home the prize. I subsequently reduced this section to a manageable size, and, having done so, cut the trunk through horizontally some four inches below the hole, and now have the nest in two sections. The measurements may be of interest. The opening is three inches from top to bottom, and two inches wide; the depth of the hole is eight inches, and the measurement from back to front inside five inches. The bottom of the hole is left somewhat rough, with small points of wood sticking up, but the entrance is most beautifully smooth and evenly worked. The hole is cut through the bark, and the section shows that the wood is sound for an inch and a half, after which the rest of the excavation was in quite rotten wood. There is another hole about two inches above and slightly to the left, which was commenced first, but subsequently abandoned in favour of the completed one. The reason for this is evident, as the face of the unfinished hole is perfectly soft and rotten, and the bark, being gone, it was unsuitable; whereas the face of the other hole is sound and firm. In this instance there is only one entrance to the nest, and not, as is said to be sometimes the case, two or more.

THE BIRDS OF GREAT YARMOUTH AND THE
NEIGHBOURHOOD.

BY ARTHUR PATTERSON.

(Continued from vol. iv. p. 535.)

Fulica atra. Coot.—C. Not so abundant as formerly, but still plentiful. When the Broads are frozen over many repair to Breydon, where they fall comparatively easy victims to the punt-guns. A number killed there, Dec. 13th, 1899. They also then occasionally take to the roadstead. Between three hundred and four hundred in one flock on Breydon near my houseboat, Dec. 26th, 1899.

Grus communis. Crane.—A. Though at one time a Norfolk resident, this species is now only an accidental straggler. Three or four are recorded for this locality; the last shot at Halvergate, May 29th, 1888.

Otis tarda. Great Bustard.—A. Although extinct as a resident, migratory examples of this bird occur from time to time in this county. One was observed to come over sea and drop in a turnip-field at Horsey in 1820 (B. of N. vol. ii. p. 30). Another was watched for some time by Capt. Rising on the Horsey marshes, Jan. 17th, 1867.

O. tetrax. Little Bustard.—A. A fine adult female shot on Southtown marshes, near Yarmouth, March 14th, 1858. One at Bradwell, November, 1885. A third at Waxham, Aug. 10th, 1889; and on May 3rd, 1898, one was shot at Kessingland in full summer plumage.

Edicnemus scolopax. Stone-Curlew.—R. Rarely met with here. One shot on Breydon walls, July 31st, 1897, and another on the Bure marshes on Sept. 16th, 1898.

Glareola pratincola. Pratincole.—A. Messrs. Paget record: "A pair shot on Breydon wall, May, 1827." They were male and female; their stomachs were filled with beetles. Were extremely dirty and besmeared with blood, and Harvey's (the

birdstuffer) wife washed them "as she would stockings," and hung them out to dry (B. of N. vol. ii. p. 65). A third example is referred to.

Eudromias morinellus. Dotterel.—R. R. Has in a few instances in late years been secured on the North Denes; much less frequent than in the earlier half of the century. An aged gunner recently informed me that (when a young man in the fifties), he several times met with these birds on the denes, which were so tame that he used to walk round them, in lessening circles, to get them to "bunch up" before shooting them. An example killed itself against Winterton lighthouse, May 30th, 1898; same time two were taken at Repps; two or three others August of same year.

Ægialitis asiatica. Caspian Plover. — A. An adult male of this Asiatic species (now in the Norwich Castle Museum) was shot in a market-garden bordering the North Denes, Yarmouth, on May 22nd, 1890. Two were seen, but only one killed.

Æ. hiaticula.—Ringed Plover.—C. With us more or less all the year round. In spring greater numbers, passing, one or two couples still endeavouring to nest on the shingle patches above high-water mark. In the seventies several nests might be discovered near the rifle-butts. I have known of some instances where eggs have been taken home by certain persons, and the young have been hatched out. This is a very wary species, often alarming flocks of Dunlins on the approach of danger. Local ornithologists distinguish a larger and a smaller variety. Local, "Ring Dotterel" and "Stone-runner."

Æ. cantiana. Kentish Plover.—N. U. May be "frequent," but is not easily recognisable, at a distance, from the immature of the Ringed Plover. I occasionally see a couple or more on Breydon in May; observed three there on a mud-flat, May 30th, 1898.

Charadrius plumialis. Golden Plover.—C. Common in the autumn, when individuals with partly black breasts are sometimes obtained. We very rarely observe it on the spring migration, although thirty were observed in March a year or two since on the Bure marshes during a severe fall of snow. I observed one as early as July 14th, 1896, on the Bure marshes.

Squatarola helvetica. Grey Plover. — C. Small flocks of

beautiful adults generally visit Breydon on their way north in spring. Sometimes abundant in autumn, as in late September and early October, 1899, when hundreds were seen, and many shot. A very late spring migrant on Breydon, June 15th, 1899.

Vanellus vulgaris. Lapwing.—C. Not so abundant as formerly, and very few nest in the neighbourhood now. Sometimes plentiful in autumn, using the uplands in daytime, and crossing to the marshes at nightfall. I have seen large flocks arrive in severe weather. Hundreds, in company with Gulls, feeding on the marshes on drowned worms, Jan. 7th, 1891, after a local inundation, due to a breakage in Breydon walls. Local, "Pee-wit," "Green Plover," and "Hornpie."

Streptilas interpres. Turnstone.—C. More numerous in the spring migration than in autumn. A flock of these, in nuptial attire, scrambling among the refuse and weeds on the flint-walls of Breydon searching for *Gammarus marinus* is an interesting sight. They are equally nimble and restless on the "flats."

Hæmatopus ostralegus. Oystercatcher.—N. U. Messrs. Paget's remark, "Not uncommon on the beach," well applies to this species: it is seldom seen on Breydon, the favourite resort of so many waders. Seven, however, were killed there on Jan. 9th, 1897. Local, "Sea-pie."

Recurvirostra avocetta. Avocet.—R. Formerly nested in Norfolk. Less seen now than a few decades ago. Six were observed on Breydon, May 3rd, 1887; I saw four on the 4th. Three were noted same locality, June 15th, 1891.

Himantopus candidus. Black-winged Stilt.—A. "A pair shot at Hickling in 1822; another, two miles up the North River, in 1824" (Paget). The latter example is in the possession of Mr. Dye. Two or three others have since been recorded as seen or shot.

Phalaropus fulicarius. Grey Phalarope.—R. R. "Rather rare; eight or nine in the winter of 1828" (Paget). Shot occasionally in late autumn; one killed in a ditch near the town, Oct. 25th, 1896. One in mixed plumage shot Sept. 8th, 1899.

P. hyperboreus. Red-necked Phalarope.—R. R. The Messrs. Paget speak of it as "very rare." I have known of more occurrences of this species than the preceding. The Phalaropes are rather partial to small isolated pools; have known them seen or

shot in ditches and ponds. One of this species swimming with Ducks on a pond at Hopton, Sept. 29th, 1881 (B. of S. p. 145).

Scolopax rusticula. Woodcock.—C. Uncertain visitor; always some, occasionally numbers, according to wind. The early October moon, with N.W. wind, favourable to its arrival. During the migration of this species many untoward fatalities are generally recorded, as beheading against telegraph-wires, capture in the streets, &c. Very dark example mutilated by Hooded Crows lying at tide-mark on beach, Dec. 27th, 1899.

Gallinago major. Great Snipe.—R. R. "Not uncommon in the autumn" (Paget). Before the sand hills were so devastated by traffic odd birds were sought for in September by local gunners. Seven or eight in neighbourhood in 1880. Usually very fat. Decidedly prefers the sand-hills of the coast to the marsh-lands. Example brought to market, Sept. 20th, 1899. I saw one there September, 1900. Local, "Solitary Snipe."

G. cœlestis. Common Snipe.—A few still nest in the neighbourhood. Occasionally during spells of severe frost a break in the weather will, for a few hours, or perhaps for a day or two, find the saline ditches near the Denes and on the marshes fairly alive with them. The first really sharp day's frost is always hailed with delight by those fond of Snipe-shooting. Such a "rush" occurred on Dec. 11th and 12th, 1899, when many scores were brought to Durrant, the game-dealer. A few hours' frost will reduce their plumpness; it was noticeable those brought up on the 13th were not so fat as those of the 11th. Continued severity drives them southward. In December, 1893, a remarkably large and russet-coloured female was killed at Caister, answering to *Gallinago russata*, Gould.

G. gallinula. Jack-Snipe.—C. The occasional late stay of this bird in its winter resort has led to the opinion that it has occasionally bred here; but, notwithstanding every effort having been made to substantiate this, nothing has occurred to justify the belief. This species does not seem so impatient of bad weather as the preceding.

Macrorhamphus griseus. Red-breasted Snipe.—A. This rare British species has been met with on three occasions: the first shot in the autumn of 1836 is recorded by Yarrell; the second

in Oct. 1841; and the third, shot on Horsey Marshes, on Oct. 9th, 1845 (B. of N. vol. ii. p. 348).

Limicola platyrhyncha. Broad-billed Sandpiper.—A. Four occurrences are recorded for Breydon. The first on May 25th, 1836, is the first recognised British example. Other dates, May 26th, 1856, April 23rd, 1858, and Sept. 5th, 1891, the last one on a meadow near Breydon.

Tringa maculata. Pectoral Sandpiper.—A. First British example killed on Breydon in Oct. 1830. Five or six others since; three being shot respectively on the 10th, 12th, and 13th Sept. 1890. Another Aug. 18th, 1897.

T. acuminata. Siberian Pectoral Sandpiper—A. An adult example of this bird was killed on Breydon on Aug. 29th, 1892; a second example was subsequently discovered in the Norwich Castle Museum, which had been killed near Yarmouth in September, 1848.

T. alpina. Dunlin.—C. Abundant in spring and autumn, increasing in numbers in winter, especially during severe weather. Breydon mud-flats swarmed with them during sharp frost in second week of December, 1899. It does not nest in the county; but I have observed young birds on Breydon in 1898 as early as July 7th.

T. minuta. Little Stint.—F. C. This species is most frequently met with in autumn, particularly in the month of September, when in some years it is not uncommon on the Breydon mud-flats. Unusually numerous first half of September, 1881.

T. temmincki. Temminck's Stint.—R. R. A spring and autumn visitor. Mr. Stevenson, in 'The Birds of Norfolk,' vol. ii. pp. 363–366, gives a detailed account of occurrences, the majority being recorded from Breydon. It has a peculiar habit of towering and uttering its sharp *ptirr*-ing call-note.

T. subarquata. Curlew-Sandpiper.—F. C. "Common in winter, but rare in summer plumage" (Paget). Occasionally mixes in goodly numbers with Dunlins. Have observed several in nuptial plumage on Breydon. Local, "Pigmy Curlew."

T. striata. Purple Sandpiper.—F. A few usually observed in October and November; generally singly or in couples on the beach. Exceedingly rare at other times, or on Breydon. It

appears here to be very unsociable, even with others of its own species. Has a decided partiality for weedy stumps left uncovered by the tide, amongst which it hunts for prey.

T. canutus. Knot.—C. Rarer in the red plumage than formerly. Very few now in May on Breydon. Common in autumn; and from its extreme tameness few escape the gunners, whose "call," in spite of lessening numbers, easily allures the survivors within gunshot. Is remarkably sociable, consorting with any of the waders who will tolerate its company.

Calidris arenaria. Sanderling.—F. C. Mostly met with on the beach. A few in spring in full plumage. In January beautiful examples, which on the wing look white, are frequent, especially in hard weather. Is the nimblest runner of all the waders.

Machetes pugnax. Ruff.—R. Formerly nested in the Broad district; has occasionally attempted to do so of late years, but to small purpose. In September immature birds are occasionally met with. Messrs. Paget refer to it as common at Acle and Reedham. Mr. J. H. Gurney gives the following calculation of the number of nests recorded during the past forty years in Norfolk ('Zoologist,' 1899, p. 115):—1858, about fourteen nests; 1868, about five nests; 1878, about two nests; 1888, about one nest; 1898, no nests.

Tryngites rufescens. Buff-breasted Sandpiper.—A. Three occurrences recorded at Yarmouth, respectively, in 1840, 1841, 1843. Two others have been met with in Norfolk, viz. at Sheringham in 1832, and another at Cley in 1889.

Totanus hypoleucus. Common Sandpiper.—C. Frequents the river Bure, also Breydon walls, in spring and autumn. Has a habit of feeding in little parties (eight being the greatest number I have ever seen together), and constantly flying and alighting ahead of sailing yachts or wherries, noisily protesting. I have long suspected its nesting here, having observed it all summer through; first Norfolk nest discovered under a gooseberry bush at Hickling, May 25th, 1897.

T. glareola. Wood-Sandpiper.—R. R. Generally met with in autumn; about one or two yearly. Stevenson (B. of N.) gives several dates; mostly Yarmouth examples. Three recorded August, 1893.

T. calidris. Redshank.—C. Nests much less abundantly on the marshes than formerly. Since close season is extended, may again increase. I observed over one hundred in one flock on Breydon flats, June 30th, 1897. Five killed, Dec. 4th, 1895. Some during sharp frost in December, 1899. Unusual in winter. Local, "Red-leg."

T. fuscus. Spotted Redshank.—N. U. "Occasionally met with on Breydon; . . . they are shot in all their plumages" (Paget), but are more often observed and obtained in the immature plumage of autumn.

T. canescens. Greenshank.—F. C. Occurs occasionally in spring, but more frequently in autumn. Small parties are met with sometimes in September on Breydon. When disturbed, its clear loud call of *pleu pleu pleu* is heard all over Breydon.

Limosa lapponica. Bar-tailed Godwit.—C. Abundant occasionally in May, although not so numerous as formerly. The gunners used to call "12th of May, Godwit day," having reference to its singular regularity of appearance. Saw seventy-seven on a Breydon flat, May 8th, 1895; seven hundred seen there, May 16th, 1898; about four hundred, May 10th, 1899. In spring is locally known as the "Red" Godwit, from its rufous attire.

L. belgica. Black-tailed Godwit.—R. R. This species formerly nested at Horsey, but has long ceased to do so; and is much less frequent than in the early part of the century. Several obtained on Breydon, Aug. 6th, 1896.

Numenius arquata. Curlew.—C. A few non-breeders continue with us all the summer. Numerous in autumn. Hundreds during the long drought in autumn of 1899 on Breydon, being starved out of the marshes. Preys here on Nereid worms living in the mud. Those known as "Harvest Curlews" are esteemed good eating, and are not so rank as those killed in winter. Specimen obtained on Breydon, Dec. 15th, 1899, weighed thirty-six ounces; the bill was $6\frac{1}{4}$ inches long.

N. phaeopus. Whimbrel.—C. Generally numerous on Breydon in May, not so plentiful in autumn, and rarely seen in winter. Earliest recorded, April 12th, 1883. Always very noisy and remarkably wary. Local, "May-bird"; "Half Curlew."

Hydrochelidon nigra. Black Tern.—F. C. Formerly nested

on the Broads, near Horsey; the last nest being found at Sutton in 1858. During the spring migration northward these birds seem to prefer following the trend of inland waters, leading the beach southwards in autumn. I have observed more cross Breydon in breezy weather than in calm. Thirty observed on Breydon, May 8th, 1894. I saw forty-two on a mud-flat in company with Gulls, May 8th, 1895. Local, "Blue darr."

H. leucoptera. White-winged Black Tern.—A. First recorded as British from a specimen killed at Horsey in May, 1853. In May, 1871, Mr. E. T. Booth shot four on Breydon; and five at Hickling, May, 1873, seeing several others. One on Breydon, April 13th, 1888; another seen there Aug. 12th, 1896.

H. hybrida. Whiskered Tern.—A. A female example was shot at Hickling on June 17th, 1847.

Sterna anglica. Gull-billed Tern.—A. Of the ten examples recorded for Norfolk, nine were obtained on Breydon; the first on April 14th, 1849; the last on Sept. 5th, 1896—an adult female approaching winter plumage.

S. caspia. Caspian Tern.—R. Nine examples, recorded in Stevenson's 'Birds of Norfolk' (vol. iii. p. 296), were killed at Yarmouth.

S. cantiaea. Sandwich Tern.—N. U. Examples obtained almost every year. Several on Breydon, Sept. 1892; two on Sept. 29th, 1894. I put one up from a floating timber on Breydon in Sept. 1899. It was sluggish, and reluctantly flew off in an easy Gull-like flight without protest.

S. dougalli. Roseate Tern.—A. It may be that this species was more frequent on our coast formerly than of late years, for Messrs. Paget remark that "Mr. Youell has known this to be shot here." One was seen by Mr. E. T. Booth on Breydon, May 26th, 1871. Of recent years it has been met with, and there is little doubt that it has nested on the Norfolk coast.

(To be continued.)

NOTES AND QUERIES.

AVES.

Robin in Shetland.—A specimen of *Erithacus rubecula*, which had been picked up dead on Mainland, Shetland, about a fortnight previously, was sent to me for identification on Feb. 13th, 1901. According to Saxby, the Robin is very rarely seen in the Shetlands; and the fact that it was unknown to my correspondent, who is well acquainted with the ordinary birds of the islands, bears this out. The specimen sent to me is probably a bird of the previous spring. The red of the throat and breast is bright, but rather pale, and of a yellowish shade.—O. V. APLIN (Bloxham, Oxon).

Blackcap Singing in February.—On Feb. 15th, at 8.35 a.m., as I was passing a small clump of bushes in a Clifton garden, my attention was attracted by an unexpected song; and in the bush I saw a Blackcap (*Sylvia atricapilla*) singing softly, as though to himself. He flew across the road when he saw me standing close to him, but at nine o'clock I found him singing again in the same place. It was a cold frosty morning, but the sun was coming out brightly. Possibly Blackcaps not infrequently winter in this neighbourhood; I was able to report one last year, on March 12th (vol. iv. p. 187).—HERBERT C. PLAYNE (Clifton College).

Marsh-Warbler at Bath.—I do not know if attention has been called previously to the probability that the Marsh-Warbler (*Acrocephalus palustris*) was in the habit of breeding at Bath (where several nests have been discovered more recently) nearly fifty years ago. Hewitson, in the third edition of his book ('Coloured Illustrations of the Eggs of British Birds'), which was issued in the years 1853–1856, in the article on the Reed-Warbler, writes:—" . . . until the last summer, during which Mr. Brown, a birdstuffer in Bath, procured for me several nests from gardens in that city, lying near the river. These were placed indiscriminately in any shrub most conveniently situated for the purpose; one was in a lilac, another in a laurustinus; and since in such a position the precaution was unnecessary [this is a mistaken idea, if the nests were Marsh-Warblers], they were not of the usual depth which commonly characterizes the nests of this species. They were not deeper than the nests of the Sedge-Warbler, and were composed almost entirely of grass, with bits of moss bound together with wool and spiders' webs, finer towards the inside; in

one only there were a few hairs." The second figure on plate xxxii., which Hewitson put forth at the time as representing an egg of the Reed-Warbler, is a fairly good representation of a Marsh-Warbler's egg. Hewitson was of course unaware of this at the time, and merely remarks that it is a good deal like some of the eggs of *Sylvia orphea*. But at the end of his introduction he adds the following paragraph:—"The egg which is drawn at fig. ii. plate xxxii. is not that of the Reed-Warbler, but of *Salicaria palustris*, a continental species. It was sent me by mistake, but will not inaptly represent some varieties which I have seen of eggs of our own British species." These italics are mine. It seems to me very likely that the eggs referred to in the italicized passage came out of the nests procured at Bath, which Hewitson regarded as aberrant Reed-Warblers' nests, but which, from the description given of them, more nearly resembled nests of the Marsh-Warbler.—O. V. APLIN (Bloxham, Oxon).

Nutcracker in Sussex.—On Dec. 21st, 1900, a Nutcracker (*Nucifraga caryocatactes*) was shot at Chilgrove, nearly seven miles to the north of Chichester, by J. Woods, Esq. The last recorded specimen in Sussex was obtained on Nov. 3rd, 1893, in Stockbridge fields, near Chichester (Zool. 1895, p. 310), where it is also stated that Mr. Borrer, in his 'Birds of Sussex,' mentions but a single example of this bird obtained in Sussex, namely, one shot at Littlington in September, 1844.—H. MARMADUKE LANGDALE (Compton, Petersfield).

Lesser Spotted Woodpecker (*Dendrocopus minor*).—At 9 a.m. on Feb. 1st, 1901, I heard this bird repeatedly tapping in a chestnut-tree at some little distance from where I stood. The bird afterwards flew into a tree close to me, and uttered its curious Wryneck-like cry several times. Is it usual for this tapping sound to be heard during the winter? I see that the text-books state it is heard in the spring.—OLIVER H. NEW (Evesham).

British-killed Egrets (*Ardea garzetta*).—In Loudon's 'Magazine of Natural History' for 1836, p. 599, Mr. J. C. Dale, of Glanvilles Wootton, in Dorsetshire, mentions that "at a sale of birds, &c., I attended in March, 1826, at Southampton, was an Egret (a fine specimen), lot 38, sold for £5 5s., probably shot near that place." Possibly this is the same specimen alluded to by Mr. Newstead (*ante*, p. 70), as the date is exactly the same, and the locality in Yorkshire may have been subsequently added to the label under the impression that it had been killed in that county. In the same year also a Great White Heron (*Ardea alba*) is said to have been shot at Hornsea, in Yorkshire ('Magazine of Natural History,' 1839, p. 31). J. H. GURNEY (Keswick Hall, Norwich).

Hairy-plumaged Moor-hens.—During the last three years I have seen and examined five specimens of a singular variety of the Moor-hen (*Gallinula chloropus*). Two were caught on night-lines in the Severn, close to Shrewsbury; one shot at Wem, ten miles north of Shrewsbury; a fourth at Onslow, six miles west; the fifth in February last, at Plowden, twelve miles south. These localities are so far apart that the birds could hardly belong to one family; their exact similarity is therefore all the more remarkable. The back and all the upper parts are of a light yellowish brown, the under parts of a very light grey; the beak and legs of the normal colours, but slightly paler than usual. They are ugly birds—not nearly so pretty as ordinary Moor-hens. The most curious feature of the plumage is, however, the *texture* of the feathers. These, instead of having the pinnae united into a compact web, have them all separate, especially on the exposed portion of each feather. The effect of this is that the bird looks as though it were clothed with hair rather than with feathers, just as in such flightless birds as the Emu and Apteryx. This defect—for it is a defect—extends even to the flight-feathers, so that the birds could not fly; the air would pass through the feathers as through a sieve. On examining the feathers by the microscope, I found that the barbs and hooklets which in ordinary feathers cause the pinnae to cling together into a compact web are almost entirely absent on the body-feathers; whilst in the quill-feathers many of the pinnae have barbs on one side, but no hooklets to hold them together. The light colour of the birds is probably owing to the absence of the dark parts of the webs of the feathers—only the light-coloured shafts are present. The entire phenomenon strikes me as morbid and retrograde, yet all the specimens seemed healthy and in good condition. I had no opportunity of examining the viscera.—H. E. FORREST (Shrewsbury).

Early Jack-Snipe (*Gallinago gallinula*).—In support of Mr. H. S. Daveport's statement (*ante*, p. 31) that the Jack-Snipe, on first arriving, may be found in unlikely places, I write to say that towards the end of September or beginning of October, 1896 (I think), I flushed two birds of this species on the links here, and about that time I saw another which a local gunner had shot near the same place. I regret the present inaccessibility of my notes prevents me from giving the exact dates, but on my return to Kent these will be forthcoming if necessary.—A. H. MEIKLE-JOHN (Kinloch House, St. Andrews).

Notes on Bird-Life from Redcar and District.—On Jan. 10th, 1901, a fine adult female example of the Stone Curlew (*Edicnemus crepitans*) was shot on the beach here. On the 12th of the same month I procured an adult female Great Crested Grebe (*Podiceps cristatus*) in winter dress on the river Tees. In January I had an adult male Bittern (*Botaurus stellaris*)

sent to me for examination. Its remains have been mounted for Mr. T. J. Wallace, of Richmond, who shot the bird near Northallerton, Yorkshire. During the last two months we have been visited by large flocks of Common Scoters, and small companies of Scaup and Long-tailed Ducks; I have handled four immature specimens of the last named species. Many Little Auks and Puffins have been picked up dead or in an exhausted condition during the past few weeks.—STANLEY DUNCAN (Redcar, Yorks).

The Origin and Meaning of the Names of British Birds.—Referring to Mr. Meiklejohn's communication on this subject (*ante*, p. 72), it does not seem to be by any means certain that there is any real connection between *poke* (=to thrust) and *poke* or *poche* (=a bag), whence we probably get *poacher*. Mr. H. T. Wharton stated that "Pochard is the bird that 'poaches,' that is, treads into the mire, as cattle do" (Zool. 1882, p. 446). We use the word "*poach*" in this sense in Oxon; and I have heard a word *potch* used to denote a falling into anything with a splash. Thus you may go *potch* into a puddle or a boggy place. I do not know if this is anything more than a slang word, but it is expressive. It is just possible (if this is an old word) that the Pochard may have been thought to *potch* into the water more than some other kinds of ducks. A bunch of Pochards certainly do make a great splash sometimes when they alight. But I do not wish to press this idea. It does not run in with "Poker." I am curious to know the ground for the suggestion that the name Pochard at first referred to the Wigeon (Zool. 1900, p. 514). By none of the early authors to whose works I have been able to refer is the Wigeon called Pochard, although the Pochard has been called Red-headed Wigeon. Unless Mr. Meiklejohn can show that the Welsh *Gwilym* (=a Guillemot) is the same word as the Welsh *Gwylan* (=a Gull; Breton *gwelan*, *goulen*, or *goelann*; Cornish *guilan* or *gullan*)—which is not likely—he will find it difficult to sustain his contention that the *guille* in Guillemot is the same word as *gull*. Ray (1674) has *Guilliam* for Guillemot; and Martin (1698) says that this bird is called "by the Welch a *Guillem*." Prof. Newton calls attention to the resemblance between the French Guillemot and Guillaume, and between the English "Willock" (a local name for the Guillemot) and William. Whether Guillemot is a French manufactured word or not, the first part of it at all events is undoubtedly cognate with, if not derived from, the Welsh *Gwilym*. It does not seem reasonable to suppose that the French called the Guillemot a "gull-gull," which would be the meaning of a Celtic-Teutonic compound of *gwelan*+*mouette* or *goeland*+*mouette*. I think that Nuthatch really does MEAN Nut-cracker (in the sense of Nut breaker). Hack (*hak*) means to cut, chop, or mangle. You cannot properly be said to hack a thing unless you cut into it, indent it, break it, or break a part off it. To "hack at" (p. 73) may be quite another thing. A bird may "hack at a nut, which may

or may not be CRACKED by the blow." This is true ; but if the nut is broken by the bird, then it has been hacked. The Nuthatch habitually breaks nuts.—O. V. APLIN (Bloxham, Oxon).

Note on the Weight and Specific Gravity of some Common Eggs.—It is with diffidence and some hesitation that I record the following details of some few eggs that I have weighed, and of which I have also taken the specific gravity, during the past egg season. It is very probable that the average weights of the eggs of the commoner species have been already recorded, and it is difficult for the dweller in the country, with few opportunities of consulting the literature of a subject, to be aware of what has been done. He is therefore restricted to the recording of facts of observation honestly, and with the greatest care and accuracy of which he is capable ; and he must leave to those with larger material and better opportunities for reference at their command the deductions which may be drawn from the facts which he has put on record. This is perhaps the less to be regretted when one recognises the danger, so difficult to avoid, of being more or less unconsciously influenced by the exigencies of an imperfectly formed theory while recording the facts which may or may not support it.

The weighings given below were made on a chemical balance turning with .001 gramme, and may be taken as accurate. The specific gravities must not be taken as absolute, but are accurate when compared *inter se*, the source of error being the weight and specific gravity of the fine india-rubber ring and thread used to support the egg while being weighed in water. It would doubtless have been desirable to have weighed a clutch of each species, but this was impossible in the time at my disposal ; in two instances, however—*Turdus merula* and *Vanellus vanellus*—three eggs from the same nest were dealt with, and it will be seen that the variation in weight and specific gravity is very noticeable. Again, if the weights of eggs of the same species are to be compared, they should perhaps be weighed at the same age, though whether any appreciable change takes place until after the bird has begun to sit regularly is doubtful. In all the cases given, except three—*Alauda arvensis*, *A. phragmitis*, and *Sylvia sylvia*—the eggs were taken before the whole clutch was laid, and in none except the last named had the process of incubation apparently commenced. With these exceptions, however, the specific gravities may be taken as comparable. It was, of course, to be expected that the weights of eggs even from the same nest would vary, but the considerable variation in the specific gravities was unexpected, and may perhaps be partly due to a varying amount of salts in the shell and contents of the egg, caused by a greater or lesser amount of lime in the diet of the parent during the time the eggs are being matured ; or it may possibly be partly due to difference

of sex, which is probably determined before the egg is laid, as it is difficult to suppose that the process of incubation can determine sex.

Species.	Weight in grammes.	Mean Weight.	Specific Gravity.	Mean Sp. Gr.
<i>Turdus merula</i>	6·798	—	1·0450	
" "	6·738	—	1·0435	
" "	6·705	6·747	1·0536	1·0477
<i>Turdus musicus</i>	5·197	—	1·0400	
<i>Chloris chloris</i>	2·281	—	1·0560	
<i>Emberiza citrinella</i>	2·621	—	1·0484	
" "	2·366	2·493	1·0501	1·0492
<i>Emberiza schœniclus</i>	2·084	—	1·0251	
" "	2·157	2·120	1·0271	1·0261
<i>Alauda arvensis</i>	3·956	—	1·0318	
" "	3·935	3·945	1·0266	1·0292
<i>Hirundo rustica</i>	2·052	—	1·0402	
" "	2·065	2·058	1·0335	1·0368
<i>Sylvia sylvia</i>	1·555	—	1·0668	
" "	1·617	1·586	1·0561	1·0614
<i>Vanellus vanellus</i>	24·725	—	1·0750	
" "	24·059	—	1·0240	
" "	22·864	—	1·0650	1·0547
" "	23·483	—		
" "	24·046	—		
" "	26·847	—		
" "	27·328	—		
" "	27·449	25·100		

HERBERT FORTESCUE FRYER (The Priory, Chatteris).

Weights of Birds.—The following birds were shot in Sussex, Kent, or Berkshire, and *weighed by me in the flesh*; so that I can answer for the weights being correctly enumerated. Nearly all the rarer species belong to me, and are now being exhibited at the Reading Museum:—

1894.—May 5th. Dunlins, 1 oz. 1 drachm; 1 oz. 2 drachms; 1 oz. 6 drachms.

July 1st. Avocet, 9½ oz. 3rd. 10½ oz.

Aug. 20th. Crossbill, 1½ oz.

Sept. 13th. Oystercatcher, 1 lb.; Knot, 4 oz. 17th. Merlin, 7 oz. 1 drachm.

Oct. 22nd. Sheldrake (young), 2 lb. 6 oz. 28th. Peregrine (immature female), 2¾ lb.

Nov. 10th. Shoveller (male), 1 lb. 3 oz. 16th. Avocet, 9 oz.

Dec. 27th. Merganser (female), 1 lb. 10 oz. 31st. Great Northern Diver (starved, immature), 6 lb.

1895.—Jan. 7th. Norfolk Plover, 1 lb. 5½ oz. 23rd. Wild Duck, 2 lb.; ditto (female), 2 lb. 2 oz. 16th. Little Auk, 4 oz.

Feb. 1st. Little Auk, 3 oz. 7 drachms. 11th. Velvet Scoter (male), 3½ lb.; (female), 2¾ lb. 18th. Whooper, 16 lb. 19th. Ditto, 28 lb.; Red-throated Diver, 5 lb. 5 oz. 24th. Guillemots, 2 lb. 12 oz. 2 lb. 7 oz.

April 19th. Hoopoe, 3 oz.

May 4th. Bar-tailed Godwit (male), 8½ oz.; Whimbrel (heaviest of five 1 lb. 2 oz., lightest of five 12 oz.); Bar-tailed Godwit (male), 8 oz. 6th. Black-tailed Godwit (female), 10 oz.; male ditto, not quite 9 oz.

June 14th. Kentish Plover (male and female), 2 oz. each. 30th. Little Crake, barely 2 oz.

Oct. 18th. Red-necked Phalarope, 1 oz. 19th. Spotted Crake, 3½ oz.

Nov. 2nd. Mute Swan (immature), 14 lb.

1896.—Feb. 1st. Guillemot (full summer plumage), 4 lb. 3 oz. 3rd. Red-throated Diver, 4 lb. 14 oz. 4th. Buzzard (male), 3 lb. 25th. Goosander (male), 4¼ lb.; Hen-Harrier (female), 1 lb.

March 3rd. Marsh-Harrier (female), 1 lb. 5 oz.

Sept. 5th. Osprey (male), 2 lb. 9 oz.

Oct. 5th. Grey Phalarope, 1 oz. 1 drachm.

Nov. 12th. Little Grebe, 6 oz. 24th. Eared Grebe, 9 oz.

Dec. 5th. Gadwall (hen), 2 lb. ½ oz. 6th. Smew (female), 15 oz. 8th. Cormorant (young male), 6 lb.

1897.—Jan. 3rd. Black Scoter, 1 lb. 15 oz. 7th. Puffin, 7½ oz. 13th. Great Black-backed Gulls, 2 lb. 13 oz., 3 lb. 9 oz.

Feb. 8th. Slavonian Grebes, 12 oz., 11 oz., 13 oz. 14th. Great Crested Grebe, 2 lb. 2 oz. 26th. Peregrine, 1¾ lb.

March 29th. Great Crested Grebe, 1 lb. 14 oz.

Aug. 11th. Little Gull, 4½ oz.

Sept. 24th. Roller (female), 5 oz.

1898.—March 1st. Great Crested Grebe, 1 lb.

April 25th. Common Geese, 10 lb. 7 oz., 8 lb. 8 oz.

Nov. 19th. French Partridge, 1 lb. 2 oz.

Dec. 16th. Garganey (young male), 11 oz.

1899.—Jan. 18th. Bittern, 2 lb. 7 oz.

1900.—Jan. 15th. Common Gull (immature), 1 lb. 7½ oz. 17th. Smew (young male?), 13 oz. 31st. Kittiwake, 10 oz.

Feb. 16th. Great Crested Grebe (female), 1 lb. 14 oz. 21st. Ditto (male), 2 lb. 7 oz. 22nd. Wigeon (male), 1 lb. 9½ oz.; Pochard (male), 2 lb. 6¼ oz.; Golden-eye (male), 2 lb. ¼ oz.

May 1st. Cuckoo, 4½ oz.—GEORGE W. BRADSHAW (54 London Street, Reading).

EDITORIAL GLEANINGS.

A PAPER recently read before the Royal Society by Mr. W. T. Blanford, LL.D., &c., is written with the object of investigating the zoological divisions of British India and its dependencies, including Ceylon, as shown by the evidence afforded by the eight volumes of the 'Fauna of British India,' containing the descriptions of the Vertebrata. For the purpose of this investigation the whole area of India, Ceylon, and Burma has been divided into tracts, nineteen in number, distinguished by various physical characters, such as rainfall, height above the sea, presence of forest, &c., and tables showing the distribution of each vertebrate genus in these different tracts have been prepared. Briefly the results are the following:—

The whole area contains portions of five different subregions, two of which are assigned to the Holarctic (Palæarctic) region, and three to the Indo-Malay (Indian or Oriental). The first two are (1) the Punjab and Sind, with Baluchistan regarded as appertaining to the Eremian, Tyrrhenian, or Mediterranean province; and (2) the higher Himalayas and Western Tibet, which belong to the Tibetan subregion. The three Indo-Malay subregions are (1) the Cisgangetic, formed by the Indian Peninsula and Ceylon, the only subregion entirely confined to the area; (2) the Transgangetic, comprising the Himalayas, Assam, and Burma within the area, and Southern China, &c., farther to the eastward; and (3) the Malayan, to which Southern Tenasserim is referred. These subregions correspond to those of Wallace, except that his Ceylonese and Indian subregions are united.

The differences between the Cisgangetic and Transgangetic faunas are explained, and it is shown that in Peninsular India, with Ceylon, traces of three distinct elements can be found in the fauna. One of these—the Indo-Malay—is common to India and the countries east of the Bay of Bengal. Another, termed Aryan, is probably a late tertiary, perhaps a pliocene immigrant from Central Asia, and is well represented in the Siwalik fossils; whilst the third, consisting of certain reptiles, batrachians, and invertebrates peculiar to Southern India and Ceylon, is thought to have probably inhabited the country longer than either of the others.

The manner in which the Burmese and Assamese fauna has penetrated the Himalayan forest area, dying out gradually to the westward, is attributed to recent immigration from Assam after the glacial epoch. This and

several other peculiarities of the distribution, such as the occurrence of certain genera in both Burma and Southern India, but not in Northern India, may be explained if the temperature of India generally went much lower in Pleistocene times; and the probability of this conclusion is strongly supported by the evidence in the Himalayas of glaciers having formerly descended 7000 feet lower than they do at present.

MR. ROBERT SERVICE, of Dumfries, has printed for private circulation a paper he read before his local Society last November on "The Vertebrates of Solway: a Century's Changes." These changes are not inconsiderable. On the rougher and hill portions of the country Black Cattle have long since been replaced by Sheep, and as a consequence heather is slowly dying out. We read that the Badger has approached extinction; the Common Seal (*Phoca vitulina*) does not visit the Solway waters with its former regularity; the Black Rat may be considered as extinct; the Common Hare only holds its own. In birds, the Martin is decreasing in numbers, and the Goldfinch even more so; the Barn-Owl seems dying out, and the Hen-Harrier, though plentiful half a century ago, is now scarcely ever seen. On the other hand, the Mistle-Thrush, once uncommon, is now a familiar species; the White Wagtail is more regular in appearance; the Pied Flycatcher breeds regularly in several places; whilst the Starling has become a most abundant species. The Adder (*Pelias berus*) must have been once very common. Mr. Service was informed that during the reclamation of a farm from Lochar Moss the number of Adders killed averaged forty per acre. In fishes, the Cod is no longer the same in number or size; but the Anchovy, which arrived in the Solway waters in 1889, remains in quantity.

THE Fourteenth Annual Meeting of the Western Province Game Protection Association was held at Cape Town on Aug. 30th last. It is most satisfactory to find that even in Cape Colony the larger game animals are not yet exterminated. We extract the following from a report in the 'Cape Argus':—

"From information supplied by the Agricultural Department, the following varieties of big game appear still to be found in the Colony. The numbers, however, are only approximate, as it is feared that during the disturbed condition of the Northern Border of Bechuanaland much unauthorised shooting of big game took place:—Blesbok: About 400 in Steynsburg division. Bontebok: About 220 in Bredasdorp and Swellendam divisions. Buffaloes: Over 700 in Albany, Alexandria, Bathurst, and Uitenhage divisions. In the first two of these districts they were specially protected until March 27th, 1901, and in Bathurst until Oct. 2nd, 1900.

Elephants : About 25 in Knysna, and 120 in Uitenhage divisions. Gemsbok : About 4000 principally in Bushmanland and Bechuanaland, with a fair lot in Barkly West division. Koodoos ; 4000, found mostly in the divisions of Uitenhage, Willowmore, Jansenville, Port Beaufort, Albany, Victoria East, and Vryburg ; and in lesser numbers in Ladismith, Oudtshoorn, Prince Albert, Riversdale, Griqualand West, Kuruman, and Mafeking. Oribi : A few are still to be found in Bathurst division, where they were specially protected until Jan. 31st, 1901 ; and in Griqualand East (where they are specially protected), and in Bathurst until Oct. 21st, 1900. Rietbok : About 450 in Komgha and Kimberley divisions, and a few in Griqualand East, where they are specially protected until May 28th, 1902. Zebra : Between 300 and 400. The bulk of them in George, Oudtshoorn, and Uniondale divisions, with a few detached troops in the divisions of Cradock, Prince Albert, and Somerset East. Hartbeest and Wildebeest in fairly large numbers are found in Bechuanaland and Griqualand West, but continued unauthorised slaughter of these animals on the unoccupied lands on the desert borders has, it is feared, already largely reduced the numbers ; but the Game Laws Amendment Act, No. 33, of 1899, passed last session, will, it is hoped, enable effective measures to be taken to put a stop to such acts. The presence of these animals in large or small numbers in the former locality depends largely on the state of the veld, and the dryness or otherwise of the season in the Kalahari Desert. Wild Ostriches : About 2500, principally in Bechuanaland, Griqualand West, and Bushmanland."

THE vanishing Mammalian Fauna of South Africa is the subject of an interesting article in the 'Cape Times' of Nov. 28th, by Frederick R. N. Findlay, from which we quote as follows :—

"It is marvellous how rapidly the countless herds of game that once roamed over the rolling plains of South Africa* have been practically exterminated. The exquisite fauna of Africa in the past added greatly to the charm and fascination which that continent has had for so many men, but they are being swept away by an unenlightened 'civilization.' Some useful and magnificent forms of feral life are already as extinct as the Dodo, and others are on the verge of extinction. No more could a Pringle sing :

'And the timorous Quagga's wild whistling neigh
Is heard by the fountain at fall of day';

for the last of its tribe fell more than a score of years ago. The Blaauwbok (*Hippotragus leucophæus*) has gone these hundred years, and its beautiful relation, the Roan Antelope (*H. equinus*), is nowhere plentiful. The White

* "For the purposes of this article, when speaking of South Africa I mean the territory lying to the south of the Zambesi and Cunéné Rivers."

Rhinoceros (*Rhinoceros simus*) can almost be said to be extinct; its black brother (*R. bicornis*) is now rarely found south of the Zambesi River, and even the Black Wildebeest is in danger of extinction. A brief period of sixty-three years has elapsed since Captain (afterwards Sir) Cornwallis Harris,* while encamped near the present site of Pretoria, at the foot of the Cashan Mountains (Magaliesberg), encountered large numbers of Rhinoceroses, and recorded what he had seen in the following words:—‘The country now literally presented the appearance of a menagerie, the hosts of Rhinoceroses in particular that daily exhibited themselves almost exceeding belief. Whilst the camp was being formed an ugly head might be seen protruded from every bush, and the possession of the ground was often stoutly disputed. In the field these animals lost no opportunity of rendering themselves obnoxious, frequently charging at my elbow when in the act of drawing the trigger at some other object, and pursuing our horses with indefatigable and ludicrous industry, carrying their noses close to the ground, moving with a mincing gait, which ill beseemed so ungainly and ponderous a quadruped, and uttering the while a sound between a grunt and a smothered whistle.’ And, again: ‘On our way from the wagons to a hill, not half a mile distant, we counted no less than twenty-two of the white species of Rhinoceros, and were compelled in self-defence to slaughter four. On one occasion I was besieged in a bush by three at once, and had no little difficulty in beating off the assailants.’ To-day the Cashan Mountains are topped with frowning forts overlooking a great town—Pretoria.

“In Pretoria a collection of animals was started some months before the war broke out; the Government bought a very valuable and extensive property bordering on the Aapies River, at the northern extremity of the town, and presented it to the National Museum for the purpose of erecting a new museum building and starting a Dieren-tuin (Zoological Garden). In September, 1899, a good start had been made at the building of the new museum, and quite a fine collection of animals for the Zoo had already been secured by Dr. Gunning; when I last saw them they were flourishing in their extensive runs. It was a Staats or Government institution, but we hoped soon to frame a scheme which would have made it a public concern. A few months ago there was some correspondence in the local papers as to starting a Zoo at Cape Town, but I for one do not think it is advisable to make the first attempt here. Mr. Rhodes has already a fine collection of animals on his Groote-Schuur estate, and the public have free access to the beautiful grounds. I consider Pretoria to be the most suitable place in South Africa for an extensive National Zoological Garden. In arriving at this conclusion I have borne the following facts in mind:—

* ‘Wild Sports of Southern Africa,’ pp. 182, 183 (fifth edition, 1852).

"Firstly, a fine property has been secured for that purpose; there is plenty of water in the river, and Hippopotami and Crocodiles, and other water-loving animals, birds, and fish will undoubtedly thrive splendidly; indigenous trees or rather shrubs, grass, and reeds abound, and the animals will at once be at home there.

"Secondly, the valley in which Pretoria now stands was, as I have already pointed out, once the habitat of a great variety of game; consequently it may reasonably be hoped that animals will prosper better there than, for instance, Cape Town,* with its climate and pasturage almost foreign to some species; or than in the London Zoo, with its fogs, cold weather, and new conditions of life.

"Thirdly, Pretoria, situated as it is, will be able to secure specimens of many rare animals in the Sabi Valley and elsewhere at a comparatively low cost, for there will be no great difficulty about transporting them.

"Fourthly, it is hoped that an extensive track of at present almost valueless country, either in the districts of Waterberg or Zoutpansberg, or the Sabi Valley, may be secured from the Government in the near future, for the purpose of forming an immense reserve. I feel confident that, once such a grant has been obtained, funds sufficient to enable us to close the territory, and to drive in and secure as much game as possible, will be forthcoming from the many men who wish to see a comprehensive scheme for the preservation of wild animals set on foot."

BIRD MIGRATION IN GREAT BRITAIN AND IRELAND.—The Third Interim Report of the Committee appointed to work out the details of the Observations of Migrations of Birds at Lighthouses and Lightships, 1880–87, was presented at the recent meeting of the British Association at Bradford, and consists of a "Statement furnished to the Committee by Mr. W. Eagle Clarke, containing a summary of the observations as regards (i.) the Song-Thrush (*Turdus musicus*), and (ii.) the White Wagtail (*Motacilla alba*)." As regards the extreme value and interest of the publication, the Committee well remark that it "throws such a light on the natural history, and especially the movements, of those two species as has never been possessed before."

* "It must, however, in fairness, be remembered that when Van Riebeeck and his Dutch companions landed in Table Bay in April, 1652, they found a great profusion of animal life roaming upon its shores. Hippopotami occupied a swamp, it is said, on the present site of Church Square, and 'Harts and Elands' were numerous on the slopes of Table Mountain. The surrounding country was 'swarming with Elands, Hartebeests, and Stemboks,' and Lions were numerous and bold; even as late as June, 1694, nine Cows were killed by Lions within sight of the Castle; and the animals in Mr. Rhodes's Zoo have hitherto thrived fairly well, although some of the species are but poor representatives of their wild brothers."

"COMMUNICATIONS" I., published last November by the "Millport Marine Biological Station," contain a summary of a paper "On Negative Evidence regarding Influence of Nutrition on Sex," by J. F. Gemmill, Lecturer on Embryology, University of Glasgow.

It is well known that during a certain period in the early development of most animals no difference, external or internal, can be detected between the males and females. This undifferentiated stage is considered by some to be a stage of sexual indifference more or less complete. There is a well-known theory that during the period in question the future sex of individuals may be influenced by nutrition in such a way that a female bias is given by rich and plentiful food, and a male bias by the opposite condition. To test this hypothesis, Mr. Gemmill selected two molluscs for observation—the Edible Mussel (*Mytilus edulis*), and the Common Limpet (*Patella vulgata*). We give some extracts as regards the evidence afforded by the first;—

"Mussels may be found in suitable places on the tidal zone at all levels' from a little below high-water mark, downwards. They feed only when immersed under water—that is to say, when the tide is sufficiently far in to cover them. Mussels placed high up on the tidal zone are thus able to feed only intermittently, and during short periods. They grow slowly, and remain small in size. The average weight of low-level Mussels on Keppel Pier, Millport, is six or seven times greater than the average of high-level specimens. These facts and similar facts regarding the fixed animals on the tidal zone (*e.g.* Barnacles) point to comparative starvation of high-level specimens as contrasted with those which occupy a lower position.

"In the life-history of the Mussel there is first a free swimming stage, then the larvæ settle down and become permanently attached. At the time when they fix themselves, and for a considerable period afterwards, their sex, so far as I could make out by careful histological examination, is still undifferentiated. During the first period of growth and differentiation of sex, the young Mussels are subject to the different nutritive conditions indicated above, according as they have placed themselves high up or low down on the tidal zone. Nature thus supplies all the factors necessary for an experiment, and works out the experiment herself. It only remains to observe, in a large number of specimens taken from different localities, the relative proportion of males and females at different levels. By comparing these proportions we shall be able to tell whether richness or poorness of nutrition, acting under the conditions above indicated, have had any influence in determining sex in the young Mussel. A large number of Mussels were accordingly examined. In order to avoid local peculiarities, the batch of Mussels were taken from many different localities.

"Results.—Out of the total number examined, 49 per cent. were males,

51 per cent. females. Of the Mussels taken from high level, 47 per cent. were males, 53 per cent. females. Of the Mussels taken from mid-level, 48 per cent. were males, 52 per cent. females. Of the Mussels taken from low level, 51 per cent. were males, 49 per cent. females. From these figures it will be seen that the proportion of the sexes varies within very narrow limits at the different levels. There is certainly not a greater proportion of males at the upper poorly nourished zones, nor a greater proportion of females in the lower zones. Indeed, the differences, such as they are, point the other way."

At the meeting of the Linnean Society held on Feb. 7th a paper was read by Mr. H. M. Bernard, "On the Necessity for a Provisional Nomenclature for those Forms of Life which cannot be at once arranged in a Natural System." Taking the Stony Corals as an illustration, the author showed how impossible it is to classify them into "species" in the present state of our knowledge (1) of the living forms themselves, and (2) of what we should mean by the term "species." He found himself compelled to invent some method of naming them which shall enable their natural history to be written, so far as it can be discovered, without at the same time having to pretend that, in so doing, the specimens are being classified in the modern evolutionary sense—that is, according to their true genetic affinities. This "natural order" can only be based upon an exhaustive study of all the discoverable variations, and only then will it be possible to arrange these variations into natural groups or "species." Further, this study, if its results are to be trustworthy, must have had regard not only to the structural details of the specimens, but also to their natural conditions of existence, in order that all these variations, which are purely accidental and adaptational, *e.g.* due to special currents, or to favourable or unfavourable positions on the reef, may be eliminated; for only those which have been normally inherited can be admitted into an evolutionary classification—at least, as at present understood.

The author contended therefore that the present exclusive adherence, for all purposes of description, to the Linnean binomial system, which implies classification when classification can only be attained as the end and crown of our work, is philosophically absurd and practically disastrous. The absurdity of starting by assuming what it is the object of all our researches to find out is self-evident; while the hindrance to progress due to waste of energy, to the assumption that the goal is attained, to the natural indisposition to rearrange previous classifications, to the synonymies which continue to grow, and must ever continue to grow, as our knowledge—which advances in spite of our methods—compels us to bring our premature classifications nearer and nearer to the natural order, only need to be mentioned to be equally self-evident.

A provisional nomenclature was therefore proposed, in order to make work possible in those groups in which, as in the Corals, classification, except in its barest outlines, is premature. The author suggested that this consists (1) of the existing generic name (or, when that cannot be discovered, the family name); (2) of the locality in which each specimen has been found; (3) of a fraction which can be understood from the following illustration:—" *Porites*, Singapore $\frac{4}{20}$ " would mean that there are twenty apparently distinct forms of *Porites* known to occur at Singapore, and the particular one referred to is that which was described and figured as No. 4. If a new *Porites* be found in the same locality, *i. e.* a *Porites* not immediately referable to any yet figured, its designation for reference would be "*Porites*, Singapore $\frac{5}{21}$." The formula which shall be ultimately agreed upon ought to be formally adopted.

DR. SMITH WOODWARD, at a meeting of the Zoological Society on March 5th, read a paper on some remains of extinct Reptiles obtained from Patagonia by the La Plata Museum. They included the skull and other remains of a remarkably armoured Chelonian, *Miolania*, which had previously been discovered only in superficial deposits in Queensland and in Lord Howe's Island, off the Australian coast. The genus was now proved to be Pleurodiran. There was also a considerable portion of the skeleton of a large extinct Snake, apparently of the primitive genus of the South American family *Ilysiidæ*. Along with these remains were found the well-preserved jaws of a large carnivorous Dinosaur, allied to *Megalosaurus*. Either the Dinosaurian Reptiles must have survived to a later period in South America than elsewhere, or geologists must have been mistaken as to the age of the formation in which the other reptiles and extinct mammals occurred. The discovery of *Miolania* in South America seemed to favour the theory of a former antarctic continent; but it should be remembered that in late Secondary and early Tertiary times the Pleurodiran Chelonians were almost cosmopolitan. Future discovery might thus perhaps explain the occurrence of *Miolania* in South America and Australia, in the same manner as the occurrence of *Ceratodus* in these two regions was already explained.

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ORNITHOLOGICAL NOTES FROM NORFOLK FOR 1900.

BY J. H. GURNEY, F.Z.S.

OWING to the mild open weather, migration was very slow during the autumn of 1900 along the east coast, and I believe it was not much better in the spring; but I was away in the South of France during April and May.

I take the opportunity of comparing the arrivals of spring birds noted there with the dates taken in East Norfolk by the Rev. M. C. Bird.* My dates are for the Var Department, all of them made within sight of the Mediterranean, and about seventy

*	South of France.	Norfolk.	Difference in Days.
Willow-Warbler	March 3rd	April 29th	—
Ruff.....	„ 9th	„ 21st	—
Garganey Teal	„ 22nd	March 23rd	1
Swallow	„ 30th	April 17th	18
Cuckoo	April 1st	„ 13th	12
Sand-Martin	„ 11th	„ 15th	4
Grasshopper-Warbler	„ 12th ?	„ 22nd	10
Nightingale	„ 13th	„ 21st	8
Swift	„ 15th	May 4th	19
Reed-Warbler	„ 17th	„ 2nd	15
Pied Flycatcher	„ 28th	„ 8th	10
Redstart	„ 28th	April 21st	—
Sandpiper	„ 30th	May 8th	8
Spotted Flycatcher	„ 30th	„ 21st	21
Turtle-Dove	May 2nd	„ 4th	2

miles east of Marseilles, and six hundred as the crow flies from Norfolk. There is nothing very suggestive in the comparison, but it shows how long it generally takes migratory birds to travel on from France to our shores, though it is not likely that they always fly in a straight line, for the fluctuations of the wind may at any time make them deviate many points east or west.

During September and October the wind in Norfolk was generally west, or some point of west, and it will be seen that it was so on the four dates on which Bluethroats appeared; but the Little Gulls seen on Oct. 21st by Mr. Southwell were driven to the shore by a high north wind. In Lincolnshire, as in Norfolk, Mr. Caton Haigh writes that the wind was persistently west and north-west, adding that up to the end of September it had been about the worst season he could recollect for migrants. With us the Rooks and Little Gulls seen by Mr. Southwell constituted the only autumnal movements out of the common, but Mr. Lowne observed an unusual number of Long-eared Owls in his district, though the season was very uneventful indeed, compared with many which I remember.

An Iceland Falcon is stated, in 'The Naturalist,' to have been shot in Lincolnshire during December; but there were remarkably few raptorial visitants to the east coast, the autumn being marked by an absence of Buzzards, though it is true I *heard* of two Hen-Harriers; and I one day saw six Kestrels near the sea (wind W.). A Honey-Buzzard—the only one notified—occurred near Thetford in November (E. T. Daubeny), but this is a species which in some seasons is no rarity.

The principal rarity to be mentioned is a Little Bustard in good winter plumage, which appeared in November. I must here allude to the fifteen Great Bustards turned out in the Brandon district last August (not allowed full liberty) by the enterprise of Lord Walsingham, in the hope that Norfolk and Suffolk may once again be stocked with these magnificent game-birds; an aspiration which everyone will share, though it remains to be seen what success will attend the attempt. In 'The Eastern Counties Magazine' for November, Lord Walsingham gives an account of the experiment so far as it had proceeded at the time of writing, and the birds are still quite safe, and in an enclosure of about eight hundred acres. Needless to say, the Norwich

Naturalists' Society has done all in its power to second so laudable an effort, and will continue to do so, while on its recommendation the Poaching Prevention Society has also interested itself in the matter.

I am indebted as usual to various correspondents for most of my information, and have only examined those birds against whose names a dagger is placed. Notes on varieties are placed together at the end, there being no importance in the dates at which they may happen to be seen, nor much interest in pied birds of any kind; but melanisms and erythryisms by their rarity are always worth recording.

JANUARY.

7th.—Wet. Eagle-Owls making their usual nest-hole.

8th.—My son brought back from Cley a Pink-footed Goose,† and saw some Guillemots.

9th.—I am indebted to Mr. W. A. Dutt and Mr. Darkins, the decoyman, for particulars of the successful winter take at Fritton decoy—the best for many years; but these figures have been already communicated by Mr. Southwell (Zool. 1900, p. 239), and need not be repeated. I also learn from him that flocks of Goosanders and Smews frequented Holkham lake, and that a Shoveler was sent to Norwich. Among the fowl taken at the decoy, Mr. Dutt reports a Long-tailed Duck, a very unusual capture. At Holkham lake there has never been a decoy.

10th.—Several Bitterns were reported at the end of December, and also in the beginning of January, which is the Bittern's month *par excellence*, when they are doubtless frozen out of more northern countries. The movement was very extended, reaching to Devonshire and other parts of England, and also to Ireland. Mr. T. E. Gunn, the taxidermist, received six for preservation, of which five were males, a proportion in the sexes which has been noticed before by Mr. Lowne, who in fourteen years had obtained only one female.

FEBRUARY.

27th.—I learn from my correspondent, the Rev. M. C. Bird, to whom I am as usual much indebted, that during one of the annual Coot "battues" a Bittern was heard "booming" on Rushhills; this early utterance of a once familiar sound, which

is strictly a pairing song, being no doubt provoked by the shooting, as Pheasants respond to thunder, or a Turkey-cock to a whistle. Gould, and previously Latham, both allude to certain dilatable membranes in the throat of the Bittern, which it is supposed produce this sound; but I have searched for them without finding anything more than one would expect to see in the neck of a Heron.

28th.—It may be remembered that in January, 1895, Little Auks were scattered broadcast along the sea-lines of Yorkshire, Lincolnshire, and Norfolk, while three hundred dead ones were counted in the latter county alone. A repetition of this mortality took place during the months of February and March, 1900 (six weeks later than five years ago), when quite as many or more were picked up in Norfolk, but fewer were found inland; and the incursion was not so marked in Lincolnshire and Yorkshire (*cf.* 'Naturalist,' p. 140) as in 1895, although I learn from Mr. W. A. Dutt that many were picked up around Lowestoft, in Suffolk. The brunt of the incursion expended itself in a space of about fifty miles extending from the Wash to Lowestoft, and reaching its maximum at Cley, where the first intimation Mr. Pashley received of this important movement was from two being shot and one picked up on Feb. 26th. Between that date and March 14th they were brought to his house by many persons, even sometimes in baskets, and many when picked up were still alive. One man told Mr. Pashley that he found thirty-two between the rocket-post at Salthouse and Harbour Point. Others were picked up at more inland localities, such as Hempstead, Thornage, Bayfield, and Glanford. On March 20th, 21st, and 22nd the wind became easterly, and he was told that about thirty more Little Auks and seven Puffins had been counted on the shore. All this week, writes Mr. Pashley, there were frosts and hailstorms, and on March 27th, the wind then being north-west, more Puffins and Razorbills were washed up, together with the fossilized core of a large horn. In such weather it was obvious that the *Alcidæ* could obtain no fish, which descend to greater depths when the sea is troubled. The first example at Yarmouth was notified by Mr. Dye on Feb. 24th, an earlier date than for Cley, and thirty more soon afterwards, chiefly taken at Caistor and Winterton, by Mr. Patterson, who handled two recently dead on April 4th.

These were the last I heard of in the county, and may even be regarded as the remnant of a return migration. At Cromer, Mr. Henry Cole reported three alive in the town-gardens, one on the watchhouse-green, the others lying or sitting upon the grass in Cromer Hall Park ; while one was obtained on the golf-ground by Mr. Savin, who saw eight on the shore at Overstrand. Another was found alive in Northrepps village, near a pond. About the same time Mr. T. E. Gunn learnt from a friend that many were lying on the beach at Bacton, and on March 3rd twelve were sent to him from Sheringham (whence a Ringed Guillemot had been forwarded to Mr. Roberts), where other Little Auks were subsequently seen by Mr. Ernest Gunn, but not fresh. On March 1st Mr. Hamond met with four or five in Holkham bay, still swimming, and afterwards he found others cast up, the fate which probably overtook them all ultimately. When once thrown up they evidently were too weak, from want of food, to use their wings, and made no further attempt to regain the sea by flying. If they did fly, they were carried inland, where, beside the localities already mentioned, four others were picked up at Whitlingham, Stalham, Brinningham, and Scottow, and forwarded to Mr. Gunn, while Mr. Bird saw one at Honing. On this occasion the Auks were apparently accompanied by no Guillemots, but, if they had been, it is very possible by Brünnich's Guillemots, which unfortunately, in 1895, were not looked out for. These northern species move about together, and the Puffin of Spitzbergen, which could be recognized by its large size, is likely to bear them company. A few sanguine people tried to keep their Little Auks alive, but met with no success, as the birds always died in a few days. No doubt most of them were starving, though Mr. Gunn found fish-bones in the stomach of one. A few of the stronger birds, as I have already remarked, made their way inland, but the skeletons of these poor waifs were to be seen on the shore for fully eight months after the disaster ; and a map of all the places where they were found would form an Auk-wreck chart. It will be remembered that in 1895 there was certainly some separation of the sexes, and apparently a preponderance of females ; this time the only person who took note of sex was Mr. Robert Clarke, who dissected twelve, and found them nearly all females. We do not know what governs the separation of sexes in birds, but a great

many instances might be quoted as proving that it frequently takes place to a certain extent, and generally on migration. It is perhaps as often noticed in the Chaffinch as in any bird, but the Brambling, Bittern, Blackbird, and Shore-Lark, among British Birds, may be cited as examples (*cf.* Zool. 1870, p. 2367).

On looking back at the past history of the Little Auk in the eastern counties, as recorded by the late Henry Stevenson, my father, and others, it would seem that Norfolk has had at least five great irruptions, and all in different months—*viz.* October, 1841; December, 1848; November, 1861; January, 1895; and February, 1900. Their visits were probably in part due to prolific breeding seasons, but still more to rough weather and unfavourable winds at sea. Without the latter, the Little Auks, however numerous at a distance from land in the German Ocean, might have lived to return north again, as they did in November, 1899, when there were not sufficient gales to cast them on the shore. It is probable that in 1841 there was the greatest visitation there has ever been, though not duly chronicled (*cf.* Prof. Newton's article in 'Science Gossip,' March, 1895), but 1900 and 1895 must have run it close.

MARCH.

Mr. Patterson has already given a good account of birds seen in the spring, but the following additional notes have been made at his instigation by Mr. Jary, the watcher on Breydon Broad:—March 9th, S.W. A good many Wigeon. 13th. S.W., strong. 300 Wigeon and Mallard. 19th. N.E., strong. A Cormorant [on this day a Cormorant was brought alive to Mr. Patterson]. 27th. S.W. 28th. About 2000 Starlings on a marsh [A. P.]. 29th. Wedge flights of Starlings moving seawards [A. P.].

The following notes are from the Rev. M. C. Bird:—March 12th. Forty-four Wild Swans left Hickling Broad, where they had been some days. 17th. A pair of Great Titmice shot in the act of taking Bees from a hive.* 21st. Hundreds of Wood-Pigeons.

* Some Tits at Keswick once behaved in this manner, attacking and killing Bees as they went in and out of the hives; but Mr. Forrest has recorded a Great Tit's nest as actually in an active hive (Zool. 1900, p. 143).

APRIL.

Mr. Jary's diary continued:—April 4th. W. Wigeon all gone. 14th. N.W. About 150 Wigeon and four Shovelers. [18th. Six Wild Geese, A. P.] 22nd. W., strong. Eight Shovelers and several Curlew and Grey Plovers, 28th. W., strong. About seventy Wigeon, and a Spoonbill (?).

The Rev. M. C. Bird's notes continued:—April 1st. Very many Yellowhammers. 6th. Large flocks of Starlings flying N.W. in the evening. 20th. About twenty Crossbills at Brunstead. 23rd. Garganey Teal seen; none known to have bred in the Broad District this year. 26th. Two Jack-Snipes.

The above is the only note I have of Crossbills for this year, with the exception of some at Belton, in Suffolk, where Mr. Lowne assures me they have been four seasons, and perhaps bred. During the month a pair of Lesser Spotted Woodpeckers were observed running up and down some dwarf apple-trees in the garden of Shrimpling Rectory (Southwell).

MAY.

Mr. Jary's Diary:—May 3rd. S.E., strong. A lot of Whimbrel, six Shoveler Ducks, and a great number of Dunlin and Ring-Dotterel. 9th. N.E. A good many Whimbrel and some Grey Plover [black-breasted, A. P.]. 12th. N.E., strong. A pair of Shovelers and about fifty Bar-tailed Godwits. [16th. A pair of Shovelers, A. P.]

Mr. Bird's notes continued:—May 1st. An Osprey seen at Potter Heigham. 10th. Fifteen Ruffs and Reeves seen; Pied Flycatcher at Runton. 26th. Three Cormorants. Cormorants have been rather common, but I have only heard of one Shag.

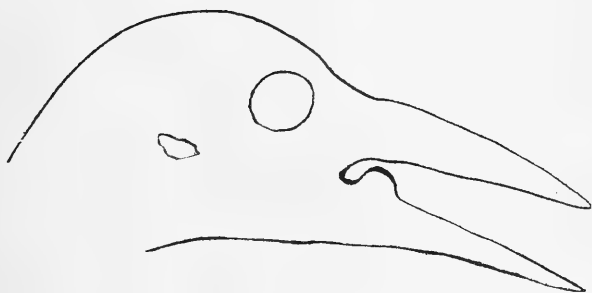
JUNE.

Mr. Jary's Breydon diary continued:—June 4th. N.E., strong. Twelve Spoonbills came to-day, and left again in less than two hours' time. 7th. W. Another Spoonbill and six Cormorants. 9th. S.W. Spoonbills gone. 11th. W. Two more Spoonbills. 13th. S.W. Spoonbills left to-day. 15th. S.W. Another Spoonbill. 18th. N.W. Spoonbill gone. 27th. N.E. Another Spoonbill came to-day, and went away again.

Several of these Spoonbills were also seen by Mr. Patterson, Mr. E. J. Eldred, and others, and it is very satisfactory to know that they were all protected. Mr. Patterson says they are even becoming common enough to receive the appellation of "Banjo-bills," and the day may yet come when, protected by public opinion, they will again breed in East Anglia, where we have plenty of tall trees and food of small fry for them.

11th.—I was greatly struck to-day by the pertinacity displayed by a Green Woodpecker, although birds in holes are always difficult to oust. We had two nests—our usual allowance—one of them in an ash, the other in an elm. The latter was so low down that I could insert my fingers or a thin pliable cane; but whatever it was, the Green Woodpecker, who felt herself master of the situation, assailed it with the utmost vigour, using that pick-axe beak with an amount of determination which would have meant death to the marauding Rat or Stoat. Owing to a stupid misunderstanding, a few days afterwards this Woodpecker was cut out of her nest-hole (a very noisy operation), and, after being well handled, was released. My daughters naturally thought it would forsake the spot, but to the delight of us all the bird was back again in the half-opened hole next day, and, being now carefully protected from further harm, she hatched her eggs successfully. When a few days old the young Woodpeckers, which became now the object of our care and solicitude, and were very noisy in the hole if they heard anyone approaching, developed a large and prominent knob at the base of the lower mandible and on either side, quite round at the top, and hard like a pea, as correctly shown in the illustration (p. 129). As the birds grew the knob diminished, and had almost disappeared when the time came for them to leave the nest. This curious growth appears to have been unnoticed by naturalists, as I cannot find any mention of it. Another peculiarity about young Woodpeckers is that the feathers seem to come without any previous growth of down. I may remark that some days before this curious knob disappeared the distinctive red of the cock's moustache was already visible. After some consultation we decided to try our luck in rearing one of them, which it was no easy task to extract from the hole, to the interior of which it clung with its hooked claws. With great care it was fed, and

eventually reared on such soft food as liver (generally chopped up), German-paste, and fruit not too hard, and became very tame, readily coming to the hand which fed it, darting out its long tongue directly anything was presented, as well as drinking with it, and climbing up me as if I was a tree. Its tongue was repeatedly protruded about three inches beyond the tip of the beak, and when it came out it could be seen to vibrate rapidly—so rapidly that at a distance of a few feet the motion was imperceptible. At the end of the tongue there is a glutinous secretion, very noticeable whenever my finger was licked by the bird—a secretion to which it is said the ants adhere. The tip of the tongue had also three hair-like barbs on either side, projecting backwards, which would no doubt also assist in the capture of these insects.



At the end of forty days from the date when I opined our Woodpecker to have been hatched, it was a splendid bird, full-winged and full-grown (the eye and skin round the eye greyish brown), but with an awkward habit of standing with its legs apart, which made us afraid it would break them, as two Greater Spotted Woodpeckers which belonged to a friend had done. As it could now feed itself, it was often put on the grass, but, having made its way to a large oak, it ascended with oblique jerkings, almost beyond the reach of a long ladder; after this it was again condemned to a cage, or we should have lost it; and, I am sorry to say, a Rat eventually killed it.

The usual height of a Green Woodpecker's hole in Norfolk—taking the average of some hundred—is about twenty feet, and the

excavation is always commenced horizontally; then, if the birds are in earnest, the hewing of the downward shaft is begun, and not many holes are abandoned after that. I have known a Woodpecker use the same hole a second year, and that in spite of its having been enlarged with a knife; but it is not usual. Neither is it usual to find the eggs stained, but that also occasionally happens. When they leave the nest-hole the young Woodpeckers are profusely mottled, but their first feathers drop off, except those of the tail, wings, and crown of the head, and are replaced by new ones—no change of colour, but a new feather.

12th.—The circumstance of ten Mute Swan cygnets in one brood at Keswick, and of two pinioned Wild Ducks laying seventy eggs between them, is perhaps not worth detailing; but the rearing of a nest of young Kestrels in St. Benedict's Church, in the middle of Norwich (S. Long), is of much local interest. A black egg of a Partridge† was laid near Fakenham, in a nest with other eggs of the ordinary colour (A. Digby), very undersized, and literally quite black, with an olive tint and some faint specks at both ends. A Corn-Crake at Northrepps had eight eggst on the railway embankment in a circle of hay-bents beneath a small Dock, and two Nightingales' nestst in St. John's Wort were very pretty. Mr. Southwell writes of five Ring-Dotterel's eggs in one nest on April 12th, one more than customary; and a Wild Duck's nest in a tree provokes the usual wonder as to how the young get down. More Hungarian Partridges' eggs were sent over by Karl Gudera, of Lower Austria, and 64 per cent. hatched out by a gentleman in West Norfolk; but it was not a good Partridge year, although, as will be mentioned presently, the unaccountable spangled race again turned up, and that on the Bylaugh estate, where "Hungarians" have never been turned down.

The above are the principal nesting notes, with the exception that two young Cuckoos were reared by Hedge-Sparrows at Northrepps, and in one case both foster-parents took part in feeding the nestling. This youngster was quite equal to a mouthful a minute, by my watch, but, not staying long in one place, it became evident that other birds, on whom it had no claim, must have contributed to its wants; and no doubt this still went on after it was full-grown. In making out lists of Cuckoos' fosterers this habit needs to be remembered, and in a former

paper I narrated an instance of a Cuckoo hatched in a Reed-Warbler's nest being fed by a Thrush. Cuckoos, however, which have not found a caterer for their wants are occasionally picked up dead, and one was brought to me this summer which I suppose had met its death from that cause. We had another young Cuckoo at Keswick, and it was noticed that the interscapulary feathers were the last ones to sprout, being still in their sheaths when the Cuckoo had become almost too big for its domicile, which in this case was again a Hedge-Sparrow's nest. The back and not the interscapulary region is employed, I believe, in the ejection of young birds by the Cuckoo; but I have never witnessed this singular operation, and there can be no connection between it and the growth of the feathers.

13th.—Bullfinches, as usual, nested in our box-hedge, which I have never known to be without a Bullfinch's nest; and here I may remark on the gratifying increase in this species of late years. Goldfinches are slowly increasing, as well as Tree-Sparrows and Hawfinches, but unfortunately the House-Sparrow also. It is not only Hawfinches which rob us of our peas, but actually sometimes House-Sparrows. In addition to their other delinquencies, they will bore through the pod of "Sutton's Ringleader," pull the pea out, and fly off with it to some adjacent apple-tree. Their beaks are very strong, and here they apply them first to one side of the pod and then to the other, until it generally gives away about the middle, and a small hole is sufficient for extracting the peas, which the proprietor and his gardener can watch them enjoying. Bullfinches are inimical to the garden, but they are also very fond of privet-berries and elder-berries; so they should not be too hastily shot down, for there is often a superabundance of fruit-buds, while in January they eat the buds of the larch.

14th.—Two clutches of Shoveler Duck's eggs, taken respectively at Woodbastwick and Lynford, have been hatched out under hens at Keswick by Mr. E. Knight. At fourteen days the beak showed a perceptible widening, which at twenty-one days had become marked, and the beak was also very long. Unfortunately all but three died, and the largest of these at eight weeks old showed the blue speculum on the wing; while at nine weeks the bills had grown very much, and were disproportionately large compared to their bodies. Their gradual assumption of plumage

was very interesting to watch, but it was not until they were seven months old that the white chest of the drake began to appear. Mr. Knight also reared sixteen Pintail \times Wild Duck hybrids, the Pintail being the male parent. These were about eight months in reaching their full plumage, and by that time the colour of the breast and head in the drakes was resplendent; but long before that their mixed parentage had been evident, even when they were only two-thirds grown. Thirteen of these hybrid ducklings were brought up under a hen, and the other three by their own parents. This month Mr. Bird was informed of a pair of Pochards being on Hickling Broad, the Duck feeding as if just off her nest, which may have been on the dryer marsh.

JULY.

10th.—Swifts reappeared in Norwich (Southwell).

12th.—Chaffinch and Thrush singing at Brunstead.

13th.—Very hot day. Barn-Owls screaming.

19th.—Two young Shovelers able to fly (Bird).

20th.—Sharp thunderstorm; eighty panes of greenhouse glass broken by the hailstones.

21st.—A Porphyrio at Sutton Broad, and again seen afterwards, but of which species was uncertain (Bird).

22nd.—Four Cormorants on Breydon Broad (Jary).

23rd.—Black-breasted Golden Plover killed at Sidestrand. This and the one last year at Waxham are the earliest I remember.

31st.—One Cormorant on Calthorpe Broad (R. Gurney). My keeper has had two Kestrels', one Sparrow-Hawk's, one Tawny Owl's, and two Barn-Owls' nests within half a mile of his three hundred young Pheasants, which the Sparrow-Hawks have not touched; but the Kestrels have paid him several unwelcome visits. Sparrow-Hawks are not so bad for game in coops as they are often represented (*cf.* Heatley Noble, *Zool.* 1900, p. 423); they like a bird which can fly; but Kestrels are certainly worse than they used to be. I have found tame Peacocks which stray into the woods a still worse enemy, and it is difficult to defend the Carrion-Crow, whose character with gamekeepers is of the blackest; yet I still generally hear of one nest hereabouts, and have a live one at the time of writing.

AUGUST.

On the 3rd very many Common Terns, as well as Lesser and Black Terns, were seen by Alfred Nudd on Hickling Broad, all heading against the high wind (Bird); and the next day, and also on the 8th, the wind being north-west and again very strong, Mr. Jary, the watcher on Breydon Broad, saw the Terns there, and what he thought were two Little Gulls. But the Terns were not the only birds which felt this cold wind. As is well known, Swifts are very sensitive to cold, and one of these birds, after flying some time round my house, entered a bedroom. Six more did the same at Postwick (G. Cross), and some House-Martins were scarcely able to fly. It seems they were affected in the same way in Norwich, for Mr. Southwell writes:—"On the 3rd of August the temperature fell rapidly, and a south-west gale set in, which was very destructive. On the morning of the 4th Chapel-field [gardens in Norwich] had the appearance of being wrecked. . . . Under the shelter of the main avenue there were twenty or thirty Swifts flying rapidly backwards and forwards quite close to the grass, evidently seeking shelter and searching for food. Large numbers of Sparrows and Robins were on the grass, and the old birds were feeding their young. It was really a most curious sight." This weather lasted until the 9th, and on the 14th the wind was in the east. Swifts were benumbed by the cold in 1859 and 1881, just as in the present summer, and it is evident they are very susceptible to it.

During this month Corn-Crakes were again rather abundant, nine being flushed in one harvest-field at Sidestrand, and many others seen near the coast (*cf.* Zool. 1900, p. 108). Prior to last year these birds had been very scarce. Spotted Rails have also become very rare, but both these birds are largely eaten in the South of Europe, a fact which may account for their diminishing numbers, as it most certainly does in the case of the Quail. At the end of the month, when the weather had improved, fifteen Quail's eggs† were found in cutting wheat at Cawston (W. H. Bidwell), a good clutch and a late date. Although on different occasions several hundreds of Quails have been turned out in Norfolk, no effect has apparently been produced, and the birds keep on getting rarer; the last nest reported was at Fakenham,

and it is many years since I have heard of any eggs in the Cromer district.

SEPTEMBER.

1st.—W. This being the day on which Norfolk shore-shooting now opens (except for Ducks), I took a long walk on the beach, annexing a Temminck's Stint,[†] adult male, and noticing a great many young Turnstones. High-tide mark presented its usual line of zoological rubbish, including fifteen remnants of Little Auks; one Razorbill, one Guillemot, four young Puffins, five Starlings, and a Rook; but most of these had been dead a long time, and the Little Auks since March. The show of Terns was very good, and when this is the case we always, in September, have Richardson's Skuas, and I obtained a good opportunity of watching their piratical habits, though I must say the Lesser Terns are altogether too confiding, lending themselves to robbery by flying about with fish in their mouths, which it would be much easier to swallow. Probably they catch more fish than they can eat; anyhow, the dexterous Skua sees his opportunity, and, dashing at the Tern, easily catches the silvery prey before it can reach the water.

3rd.—My nephew, who was sleeping on board a smack, saw Green Sandpiper, Common Sandpiper, Greenshank, Whimbrel, Shelduck, Gannet; and, on the shore, Whitethroat, Ring-Ouzel, and what he believed to be two Blue-throated Warblers; and his companion shot several Turnstones, and another man shot a Scoter.

5th. Three Black-tailed Godwits reported on Breydon (Patterson).

6th.—Went to Cley again, and saw, at Mr. Pashley's, a very young Red-necked Grebe[†] with dark facial stripes, which had been shot on Blakeney bar. The occurrence of such immature Grebes is certainly curious, and this is the third, if not the fourth *Podiceps griseigena* taken at Cley, and two of them were not full grown (*cf.* Booth's 'Rough Notes,' pt. xiii.; Zool. xi. p. 142); yet there does not seem any likelihood that they are English-bred ones.

8th.—Solitary Snipe in Yarmouth market (Patterson).

9th.—W. Five Blue-throated Warblers seen at Cley, of

which one at least was an adult male;† and the next day, the wind being again west, a young one was shot (Pashley).

13th.—Pectoral Sandpiper in Suffolk (Zool. 1900, p. 521); wind N.E., but with us it was S.E., and the day before N.

18th.—W. Two more Bluethroats, a Pied Flycatcher, and a Blackcap on the shore (Pashley); the wind on 16th and 17th was S.W.

OCTOBER.

1st.—Pair of Pintail at Yarmouth, the duck unusually rufous (Patterson). A Solitary Snipe† sent to Mr. Cole; wind yesterday S.W.

2nd.—W.S.W. A Buzzard† circling over our boathouse, or some large bird of prey like one.

3rd.—N.N.W. Mr. Gunn saw on the coast about ten Richardson's Skuas, and a good many immature Gannets, Red-throated Divers and Razorbills, one Guillemot, and one Sandwich Tern; and Mr. Pashley reports two Pomatorhine Skuas, a Little Stint, and a Grey Phalarope about this time.

16th.—Scoter shot on Rockland Broad (R. Gurney).

21st.—[N.E. at Keswick.] Nine or ten Little Gulls, mingled with large numbers of Common and Black-headed Gulls, observed for some time off the harbour pier-head at Lowestoft by Messrs. T. Southwell and H. Bunn, but only one came into the harbour. Mr. Southwell considered their presence due to the high north wind, which was force five, with frequent rainstorms. From ten o'clock until two he also took notice of a constant stream of Rooks coming in from the sea in parties of from two to a hundred, and this movement was continued on the 22nd, when the wind was N.N.W.; but the Rooks were then in much smaller numbers. It would appear that this movement of *Corvidæ* had a broad front, extending as far as Yorkshire, for on the 20th unprecedented numbers of them had been seen at Humber Mouth, and smaller detachments on the 21st, by Mr. Caton Haigh. At the same time that Lowestoft Harbour was full of Gulls, Mr. Patterson reports Breydon Broad as being also crowded with them, but the Little Gulls were not detected there.

26th.—S.S.W. A Little Owl shot at Oulton (W. Lowne); perhaps not a migrant, as so many have been turned out in Kent (cf. Meade Waldo, Zool. 1900, p. 556) and Buckinghamshire;

the day, however, was coarse and windy enough to have driven any migratory bird out of its reckoning, and October is the migrants' month.

31st.—S.W. Messrs. Mortimer and Ramm saw ten Blue-throats on the coast (Pashley), but did not molest them. This is the latest date any have been seen, but it was a remarkably warm day for the time of year.

NOVEMBER.

10th.—W.S.W. A Barn-Owl of the fulvous type shot at Lowestoft (H. Bunn). Fulvous examples are generally supposed to be of foreign origin, and the high wind from S.W. last night may have brought it over. This Scandinavian race was first recognized in England in 1864 by the late Henry Stevenson.

11th.—We have a very late Barn-Owl's nest in an elm-tree in a hole in an arm four feet deep and a foot wide about, and how the old bird gets down to the young ones and then returns is somewhat of a mystery. Barn-Owls, like Wood-Pigeons, are distinctly irregular in their time of nesting. They generally make use of a tree, but a hollow arm is safer. Here they construct no nest, and any sticks which may be found are sticks which have been brought in by a former owner. If disturbed they often try to impart terror into the intruder by a ludicrous swaying to and fro of the body, which at the same time is attenuated by muscular contraction of the feathers. Other Owls have their characteristic ways of defiance, but quite different from the habits of our mousing favourite, the Barn-Owl, whose white body seen swaying in the dark quickly shows a fresh comer that the residence is occupied. In this instance they selected a hole which in a previous season had produced a brood of young Tawnys.

20th.—Another Barn-Owl's nest, containing only two young ones, however—one of them in the down, and the other almost as fully feathered as its parents—an extraordinary contrast, for the elder bird may have sat upon and hatched the egg from which the younger one came. Two is a very small family, for the Barn-Owl will sometimes have six, and I have twice found as many as seven eggs. When the young are nearly half-grown they make a peculiar wheezing or snoring sound, which, I believe,

I have also heard proceed from the parent, but of this I am not sure. By remaining perfectly still it becomes distinctly audible, but the Owls are very alert in detecting the sound of footsteps under their tree. It is difficult to understand what purpose this wheezing noise can serve, and unfortunately it often leads to their detection. I have encouraged and protected Owls in every way for many years, but never had nests in November before, and do not for a moment believe that either of them contained a first brood. One of my Owl-tubs which blew down some weeks ago contained what I can only describe as a felt carpet of mouse remains, the stamped-down pellets and rejectamenta of two years; but mingled with this mass was the platform of a Stock-Dove's nest. A Barn-Owl's home is at all times distinctly odoriferous, and compares unfavourably therefore with that of a Tawny Owl, which latter bird, I am assured by Mr. Meade Waldo, never leaves castings in its hole. It was from the above-mentioned tub that Mr. Bird and I on one occasion counted the skulls of thirty-eight Sparrows, one Rat, one Shrew, one Long-tailed Field-Mouse, and two Short-tailed ditto, which my man had thrown out; but in general my investigations have shown a much larger proportion of Mice than that. A pellet generally contains two Mice, sometimes the bones of four, and it does not take very long for thirty or forty pellets to accumulate in a hole, and probably four times as many are ejected elsewhere. Many of the old Norfolk barns have "Owl-holes"—round holes at the top under the eaves—but now that the plan is to stack everything out of doors, and sell the grain when it is threshed, the Owls' services are not so much appreciated. There is still a prevalent idea that Owls and Cats will kill but not eat Shrew-Mice, which is quite erroneous so far as the Barn-Owl is concerned, for Shrew-skulls are often to be found in their castings; but I have never found remains of a Bat.

Field-Rats have been more abundant during the autumn of 1900 than for many years, and no wonder they increase when the gamekeepers systematically destroy nature's police. Persons may do great harm who spread poison in stacks for Mice, as Barn-Owls have been killed near Lynn with poisoned Mice. I have lately heard of two Barn-Owls caught in Rat-traps whilst in search of the very vermin for which the traps were set. In one case the

steel-trap was so far down a Rabbit's hole (more than a foot) that it is a marvel how the Owl stretched its leg far enough in to be caught.

26th.—A Little Bustard,† female adult, shot at Ludham, in the Broad district, by Mr. Neave. A Red-necked Grebe shot at Somerleyton (H. Bunn), and five Egyptian Geese out of a flock of nine on Breydon Broad (B. Dye), whether really wild ones it is impossible to say. This week Mr. Gunn received a Grey Shrike from Diss.

28th.—Eight Norfolk Plovers which had not emigrated flew over a friend whilst shooting at Cranwick, near Brandon, a proof of the mildness of the month. Young Wood-Pigeons a few days ago were still in a nest at Caister, and I had five House-Martins in my garden on the 13th.

DECEMBER.

2nd.—Four House-Martins at Keswick, one near Swaffham, one at Northrepps a few days afterwards, and one at Feltwell; and, at the end of the month, either a Swallow or a Martin in Cromer churchyard (the 'Field.') In Norfolk, Martins have oftener occurred in November and December than Swallows, probably because they sometimes have very late broods; and this may be the result of persecution by Sparrows, which has also tended to make them much less common than they used to be.

6th.—My young Barn-Owls are still in the first nest in the old elm, but perhaps it is only as a dormitory that it is used. The young, however, are always very slow in maturing, not being properly fledged for seventy days; they are invariably of different sizes, and they do not leave their nest-hole so soon as young Tawny Owls.

7th.—This parish is also never without its Tawny Owls, but they do not nest in my tubs, preferring a natural hole. I have seen a young one peep out long before it could fly properly, which a White Owl would never do, and the young ones are not infrequently picked up on the ground. One so found, which we caged, is now a fine bird, and every night and morning one of its wild relations comes and hoots outside the cage, but never brings the prisoner anything. I like nothing better than listening to

the weird "hoo-hoo" of three or four Tawny Owls answering one another on a starlight night in December—a sound so vigorous, and yet so difficult to locate; and I believe Lord Lilford is right in saying that a clear frost only makes them more noisy. They go on at intervals to midsummer, and young and old carry on a regular concert at the end of July over their evening supper in the ivy-clad trees. The Tawny Owl is not so dazzled by the light as a Barn-Owl, which in the daytime acts as if it was half-blind. A curious accident happened in April to an Owl which struck the engine of the Fakenham train whilst in motion, attracted, it was supposed, by the light on the engine. It passed clean through the engine-driver's small look-out window, smashing the thick glass to pieces, and was picked up with only a broken leg. From the stationmaster's description it was probably a Tawny Owl. Owls sometimes, I am told, fly round Cromer lighthouse without striking, either attracted by the light, or in pursuit of moths which hover round it.

31st.—A hen Pheasant shot about this time at Caister had spurs, but no indication whatever of male plumage, as I am told, for I only saw its leg. It is not the first time such a Pheasant has been obtained, but they are very uncommon.

VARIETIES OF PLUMAGE.

One of those curious chestnut-coloured Partridges was seen near Dereham in October, and the same or another was shot near that place on Nov. 23rd, by which time it was in superb plumage, and very like the plate in 'The Zoologist' (1900). I am much indebted to Mr. W. L. Boyle for this richly marked example,† which has the usual light-coloured head, but is rather greyer on the upper part of the back than the one I illustrated. Surely no such persistent instance of erythryism is known in any other species of bird; while the similarity of all the Norfolk specimens is very remarkable, and might well excuse the continental naturalists of a former generation for making a species of *Perdix montana*. About Dec. 20th another† was shot, also on the Bylaugh estate, and transmitted to Mr. Gunn, at whose house I saw it—a large bird, much more spangled on the back than mine, but having, like the rest of these birds, a little of the pale colour of the head scattered over the upper part of the breast. Both my

Partridge and the December one had, when fresh, the red patch of skin behind the eye which is a character in adult Partridges of the normal type.

On May 18th the Rev. M. C. Bird received an albino Robin from Hempstead, and in September the 'Field' recorded a white Swallow at Gunton, in which month I saw a pied Robin† at Northrepps. A pied Mallard† with a very dark back, forwarded by Mr. Patterson, was bought in Yarmouth market, but may not have been a wild-bred one. Mr. Lowne received a primrose-coloured Greenfinch alive from Bury St. Edmunds.

CORRECTION.

The Ruddy Shelduck,† stated to have been shot near Yarmouth (Zool. 1899, p. 123, and 1900, p. 530), was, I now find, shot at Blakeney by Mr. Long, the well-known wildfowler, and it is impossible to say whether it was a wild bird.

AFFECTION AMONG BIRDS.

A pair of Barton Mute Swans frequented Mrs. Lubbock's little broad at Catfield during the autumn; one of these birds was wounded (an old gunshot wound probably), and died at the end of September. On October 1st Mr. Bird saw the hen Swan sitting by the side of her departed—feather to feather. This she—more or less, off and on—continued to do, never going more than a few hundred yards away, until the carcass was all gone excepting a few feathers and bones. Even the large bones—sternum, leg, and wing bones—had been carried away (by Rats and Crows) before the poor old hen relinquished her watchings, for on November 26th Mr. Bird disturbed her from within a few inches of the remains.

FURTHER NOTES FROM LLEYN, WEST CARNARVONSHIRE.

BY O. V. APLIN, F.L.S.

WHEN staying in Wales last May (1900) I paid a short visit to Lleyrn, while the gorse blossom was in its glory, the high turf banks still studded with primroses, and the plantations in their tenderest green, and often blue underfoot with bluebells. But during my stay Lleyrn was wind-swept even more than it usually is, strong N. and N.N.E. winds only giving way (with about twelve hours interval) to half a gale from S.W. Some luxuriant hanging woods near the foot of Rhiw, at the north-west corner of Hell's Mouth, skirted by about the longest and steepest hill-road I ever saw in this country, was so wind-tossed that I gave up the attempt to listen for Warblers, though the strong song of the Chaffinch rang out from time to time. This state of the weather naturally interfered with my pursuits to some extent. But as it did not prevent me from hearing almost all the small birds I had previously noticed,* I do not think it would have hindered me from observing those woodland species of which I was especially in search had they been present. The plantations at Nanhoran were indeed, from their position, fairly well sheltered. But though Wood-Wrens, Willow-Wrens, Chiffchaffs, Whitethroats, Chaffinches, &c., were almost constantly in song about the edges of the belts of wood, I could not find the birds I was looking for. The Green Woodpecker was noticed again—on four occasions—and I think may be considered fairly common; but I have not yet identified the Pied Woodpecker, which I have seen in the Merionethshire woods. I again failed to see or hear (in the western part of Lleyrn) the Redstart, Blackcap, Garden-Warbler, Tree Sparrow, Ray's Wagtail, Nuthatch, and Lesser Whitethroat. With regard to the last-named bird, I think Mr. T. A. Coward's nest may have belonged to a pair which had accidentally wandered to the district (*vide* 'Zoologist,'

* Cf. 'Zoologist,' 1900, p. 489.

1893, p. 395), for I could not find the bird even in Merionethshire (where the Blackcap and Garden-Warbler were fairly common); and a good resident observer told me that it was not found there. Ray's Wagtail, too, is almost unknown in parts, at all events, of Merionethshire. I visited Carn Fadryn again in a vain search for the Twite. But so furious a gale had arisen by the time I reached the mountain, that I had great difficulty in keeping on my legs when at the top; so I do not think I proved anything either way. But the Twite seems very local in North Wales. I did not meet with it in the mountains between Dolgelly and the coast, which I walked over. The only small bird I added to my list of Lleyn birds is the Reed-Warbler. One of these birds was singing, every time I visited the spot, in some tall reeds of the previous year's growth in the marsh at Abersoch. Only once (on the one calm evening I enjoyed) did he show himself. Being cut off from the spot he constantly haunted by a broad deep drain, I could only make out a river Warbler, plain brown above and paler beneath. But the leisurely song was quite characteristic, and I think unmistakable. The bird's habits, too, contrasted strongly with those of the restless Sedge-Warblers around. For even on a morning when the reeds were rudely wind-shaken, and the Reed-Warbler sang, concealed from view, from one and the same place for half an hour, the Sedge-Warblers were always on the move, showing themselves continually, and every now and then, as is their wont, dancing up into the air to sing on the wing.

The only other bird I added to my list is the Common Sandpiper. One was running on the shore, left bare by the tide, on the east side of Pen Cilan on the 18th; and before breakfast the next morning there were several at the mouth of the Afon Soch and a little way up the stream. They were very lively. One was singing (the bright spring notes and trills really amount to a song) very gaily, and even mounting up into the air to sing. I watched a pair of Nightjars (birds which I had not previously met with myself in Lleyn) one evening among the big sand-hills at Abersoch, uttering their "gwik," clapping their wings, and occasionally "turring." Another bird new to me there was the Common Tern, one of which was fishing in Abersoch Bay on the 23rd. This year I saw three pairs of Lesser Terns in

the bay. Dr. Dobie told me he heard a Grasshopper-Warbler near Llanbedrog on the night of the 18th. I saw a Grey Wagtail about the stream which runs through Aberdaron, which is, I suppose, as far west in Carnarvonshire as the bird would be met with in summer. It is only the second time I have met with it in Llyn. Stonechats were common; but I saw no Whinchats this year. Corn-Crakes were not quite so common as in the previous year. The Blackbird is certainly remarkably abundant in Llyn, far more so than the Song-Thrush. I saw Mistle-Thrushes several times, and heard one singing as late as the 22nd. Robins are tiresomely abundant in a place where you think it your duty to put the glass on almost every small bird you see. Possibly they do not migrate in autumn from this mild land, and so do not suffer any losses on passage; and of course there is no hard weather to cut them off in the winter. I saw Goldfinches again, and Spotted Flycatchers several times. Unfortunately when I revisited the spot where I had found the Girt-Bunting the year before the rain was coming down heavily, and though I lingered about for half an hour, I saw and heard nothing of it. One evening as I was walking along Penrhyn Du, brilliantly lighted up with cushions of gorse, blooming as it never blooms in bleak Oxfordshire, I saw a beautiful adult male Merlin flying along the slope just above the sea, and not far below me. As this cliff is many miles from where I saw one the previous year, the Merlin may be not very uncommon. I was glad to see Choughs (four pairs) in their old haunts. Two pairs walking about on a steep grassy slope, varied by gorse and heather, made up a picture to delight the eye of a naturalist. In the bright sunshine the glossy purple-black of their plumage and their red beaks showed up well against the green background. They were feeding and occasionally preening their feathers. Choughs are very affectionate birds. The individuals of the respective pairs kept close together, and I saw one pair fondling one another with their bills. Every now and then one would call "k'chare"—a short note. When feeding they pecked quickly at something among the grass, apparently picking up insects; or they poked their bills into the ground or tufts of herbage. Several times while I watched them, one flew up and perched on a low wall separating the cliff from the fields, called "k'chare," and looked about it;

then rejoined its mate. Presently they all rose, flipped over the wall, and settled again to feed in a sheep pasture. I do not know what was the state of these birds' domestic arrangements, but they evidently had not got young; and their leisurely behaviour was very different from that of the busy pushful Jackdaws, which in a constant stream came up over a sheer cliff-edge and made their way to the fields, while a persistent succession of returning birds dropped into space and, wheeling round, made for the cliff-face. The numbers of Jackdaws breeding along this coast is astonishing, both here and in other parts of North Wales. Any-one watching the ways of the gentle Choughs must, I think, have the sad conviction forced upon them that these birds are not of the fittest to survive. Some Pigeons haunting the cliffs near the end of Pen Cilan, in company with Stock-Doves, were merely domestic Pigeons gone wild; they had no white on their backs. Trwyn Cilan is a magnificent headland, rising to a height of upwards of three hundred feet. At one spot is a grand perpendicular cliff-face, formed by a landslip, of nearly horizontal strata. It is somewhat irregular of outline, and slopes up from the east until it attains its height, and then merges into the long grassy gorse-dotted slope of the headland which has not slipped. At the foot of the cliff the mass of fallen rock and earth, which fell long ago, forms a steep green gorsy slope. The cliff-face is much weather-stained, grey-green in places with long hanging lichen, or brilliantly green with ivy, and brightened with a few patches of pink thrift and white sea-campion. Facing about south-east this cliff and undercliff afford a warm and sheltered spot for birds. A few Herring-Gulls and many Jackdaws were breeding; some Wheatears flitted about, and Rock-Pipits were pretty common. At the top the seaward slopes here, as elsewhere along this coast, were in some places coloured a pale grey-blue, so thickly did the beautiful little *Scilla verna* stud the turf. I found several plants bearing white flowers, and one with the blossoms white faintly tinged with pink. In more broken ground this delicate squill, thickly mingled with dwarf examples of dark blue *Scilla nutans*, produced a breadth of blended colour which would have called forth the admiration of the planter of the most formal bulb-beds. Herring-Gulls breed here and there all along the range of cliffs from Pistyll Cim to Hell's Mouth, as well as

on the islands off the coast. We found three eggs in a nest on St. Tudwal's, and a bend in the cliffs near Trwyn Cilan enabled me to drive a bird off her nest, also containing three eggs, which she was loth to leave on account, probably, of the Jackdaws ; but with these exceptions I only saw two eggs in any nest in the third week in May. On the west side of Pen Cilan rows of Shags sat on some long ledges, overhung with rock, in the lower part of the cliff. Cormorants, the adults easily distinguished a long way off by the white thigh patch, also resort to the cliffs ; but the Shag is much the commoner species. In the caves of St. Tudwal's Island two Shags were sitting on their nests. One was not very high up. She was very savage, and, partly at us and partly at a Razorbill just below her, made savage demonstrations, opening her beak and showing her yellow mouth, and wagging her head violently, making the while a low angry croaking cry. She showed not the least sign of fear, and did not leave her nest, although we were not far from her. But the nest was quite safe, as it could only have been reached with the aid of a long ladder. Another was rather high up, and quite at the mouth of the cave. When at the top of the island we could see down into this large nest, made of seaweed, dead herbage, and a few large dead plant-stems as thick as one's finger. The single egg it contained lay quite at the edge of the nest. The bird had to be gently pelted, and actually hit by a small stone before she would leave the shelf. We saw there a grand old Cormorant, and some others, besides more Shags. Kittiwakes breed in some numbers at Cilan, but had not, I believe, begun to lay. Quite a flock of them sat on the sea a little way off shore, and every now and then a chorus of their curious cries broke out. I saw only one Lesser Black-backed Gull there. This species does not seem to be at all common in Llyn in summer. An Oystercatcher's nest on Mercrosse had three eggs on May 15th. A few breed on the islands, and they are fairly common round the coast. There must be something very attractive about the shelving rocks on the east side of St. Tudwal's to the Purple Sandpiper. I have already recorded two occurrences of this bird there in May, and I can now add another. On the 19th, as we backed our boat into one of the caves, we came within a couple of yards of a Purple Sandpiper on a shelf of rock. It was not in adult

plumage, and had light-coloured feather edges. The entrance to this cave is narrow, and the bird could not make up its mind to pass us; so it remained where it was, shuffling its feet and shifting about uneasily. At last, when we came further in, it flew to a ledge on the other side of the cave, and then, as we landed on a shelf, slipped by us and darted out, being joined outside by another, which we had not noticed before. It had a pretty little twittering cry.

Puffins, on account of the constant bad weather, were very late in coming to the land in 1900. On May 17th I could see them, with a glass, sitting as thick as flies on parts of St. Tudwal's Island, but they had only that day returned to the island, having been away for five days because of the bad weather. Two days later, when I landed on the islands, the Puffins were in numbers on the land, and as I walked over the warrens many came out of their burrows, where they were very busy. One came out in such a hurry that it went head over heels down the slope. Grating cries of *arr* and *orr* came from below, probably from mating or quarrelling birds, and occasionally I heard a cry from birds sitting on the sea. I got my hand to the end of a lot of burrows, and caught several birds—once two in the same hole—but found no eggs, and only once some nest materials. Birds could be heard hard at work scratching in the burrows. Bearing in mind the statement that a Puffin underground will take hold of the hand introduced into the burrow, and suffer itself to be drawn out rather than let go, I gave several birds an opportunity of doing this; but, although I persistently fumbled my fingers about their beaks, I could not induce one to take hold. An experienced man, however, told me that the birds are much more savage, and “bite” better when they have young, or are sitting hard (but I have pulled out more than one sitting bird without getting bitten); otherwise I should have thought that possibly they did not bite much in the dark. For at all times, *when* they have been pulled out into the open, they bite, or try to bite, savagely, and scratch too, inflicting surprisingly severe wounds in the latter way. The Rabbits here (which are numerous and tame) are not at all afraid of the Puffins. As I sat at lunch close to a crowd of Puffins outside the burrows, I saw several young and old Rabbits come out and sit about

among them. A dead Puffin, fresh and bleeding and half-eaten, had probably fallen a victim to an immature Great Black-backed Gull which was flying about, and a young Rabbit had doubtless shared the same fate. The Peregrine is now only an occasional visitor, but I have seen two eggs (from a clutch of four) which were taken in the cliff in 1885. When I was writing the article on the Puffin in 'British Birds, their Nests and Eggs,' and treating of the attitude of this species when on the land, my personal experience of the Puffin at its breeding stations had been gained in situations where it was difficult to get close to the birds. And, while I was convinced that the Puffin could and did stand on its feet (as distinguished from the foot and tarsus), I retained an impression that I *had* seen the Puffin resting on its foot and tarsus. Also I could hardly avoid being influenced by the very positive and definite statements in support of the latter attitude (when the bird was standing still, at all events) to be found in the standard works on ornithology,* and by the numerous figures of the bird which I had seen.† I was therefore obliged, in the work mentioned above, to confine myself to a qualified statement on the subject. Last year, on looking over my notes, I found that I had written down no exact statement bearing on the matter; but, feeling more and more dissatisfied with the generally expressed view of the Puffin's attitude on land, I paid especial attention to the point during my visit to Llyn. In addition to several less prolonged observations, I sat to eat my lunch and smoke a pipe within from ten to fifteen yards of a lot of Puffins sitting on a slope covered partly with very short turf and sea-pink, and riddled with burrows. There is of course no doubt that when standing still in its ordinary attitude the Puffin stands on its foot (commonly speaking) alone, and not on its foot and tarsus. In point of fact, the tarsus is frequently not

* Yarrell's 'British Birds,' and Seeböhm's 'British Birds.'

† Although photography has made known the real attitude of the Puffin on land, very little notice has been taken of the erroneous way in which it has been represented. The Puffin is wrongly represented in Yarrell; Wood's 'Natural History'; Morris's 'British Birds'; Bewick; Mudie (Feathered Tribes); Gould's 'Birds of Europe'; Booth's 'Rough Notes'; and 'British Birds, their Nests and Eggs' (1898). It is correctly delineated in Lord Lilford's plate, and in Willughby's 'Ornithology' the Puffin is figured with the tarsi off the ground.

far short of upright, *i. e.* the back of the tarsus forms a very large angle, although not quite a right angle, with the ground the Puffin stands on, if that ground is level. But the angle of the tarsus with the ground varies considerably, as also does the angle of the line of the bird's body and the ground; but, roughly speaking, the tarsus is far more nearly upright than horizontal. It is possible that if Puffins are seen which seem to be, for the moment, resting on the tarsus, they are birds which have paused in the act of raising themselves from a recumbent position. In no other way can I account for the impression that I had acquired. I noticed many Puffins among the crowd which were sitting about their burrows lying down on their breasts like Ducks, and basking in the warm sunshine. But the Puffin undoubtedly walks and stands on its feet alone, and not on its feet and tarsi like a Guillemot. St. Tudwal's Islands have long been celebrated locally for their Puffins. The Rev. William Bingley, who in the summer of 1798 sailed round the coast from Carnarvon to Pwllheli, and, after vainly attempting to land on Bardsey Island, sighted these islands, records that a considerable sum of money was annually made of them as Puffin-warrens. The same author remarks on the variety of Sea-fowl inhabiting the cliffs of Lleyn, and adds that in one part he could observe some hundreds of Martins flitting along the black cliffs and caverns in pursuit of flies and other insects for their young. These were possibly Sand-Martins, which are now remarkably common in some places.

Like Bingley, I was prevented by stormy weather from getting to Bardsey Island; but on May 16th, with the aid of four strong rowers, I got out to Ynys Gwylan fawr and Ynys Gwylan fach. These "Gull Islands" are formed of the same hard rock as the point off which they lie. On the east the sides are formed of broken step-like jagged rock, up which you climb or walk, if you find the right place. The larger island carries fair grass on the top, with a quantity of sea-pink and scurvy-grass (*Cochlearia*). In the middle is a rocky peak. There were a good many Puffin-holes, and a good many birds, with some Guillemots and Razor-bills, sat on the sea; but there were none ashore, being unusually late on account of the stormy weather. Many Herring-Gulls were breeding, and I found a number of nests placed on shelves and in hollows among the rocks, usually, but not always, where

there was a little peaty soil, turf, and thrift. Other nests were in the turf at the edge of the rocks. The nests were made of dead grass, scurvy-grass, thrift, &c. The amount of the material depended on the situation of the nest. When in the turf or thrift only a small quantity was present, and the nest consisted merely of a depression with a slight lining; but in rocky places the cup was substantially built. When the nests were in sloping places the lower side was well banked up with material, a large clump of sea-pink being used sometimes for this purpose. One nest on the bare rock was formed entirely of dead stalks of scurvy-grass. I found no more than two eggs in any nest. One egg found in a nest on the top of the island near the edge of the flat part seemed from its size to belong to the Great Black-backed Gull (though it was somewhat small for this); but, though one of these grand birds hung in the wind with a crowd of Herring-Gulls, I could not ascertain if the egg belonged to it. There were many Oystercatchers about, and some Rock-Pipits, and one Shag left the rocks. A Cormorant came round the boat as we left the islands. The wind was so violent that it was not easy to stand upright on the top of the island, and it was impossible to examine the west side of the islands from the boat; so I could not tell exactly what birds there were, and I probably overlooked some. I picked up the bleached skull of a Weasel on this island. The top of the outer island is covered almost entirely with scurvy-grass, with a lot of sea-pink round the edges. Many Herring-Gulls were breeding on it. One pair of Great Blackbacked Gulls hung in the wind over their nest, uttering a low deep "cag-cag-cag." The nest was quite by itself, away from those of the Herring-Gulls, in the middle of the highest part of the flat top, among the scurvy-grass. It was a cup-shaped hollow, shallow, but well shaped, and had a fair amount of materials, consisting of dead herbage. Two beautifully-marked eggs had been laid. A stray Curlew went away with its rippling whistle. The weather was so bad, and the men seemed so anxious to get away, that I could not examine the island properly. As it was, we had hard work to get back to Aberdaron, and got very wet before we landed opposite the little Norman church, which has sheltered so many weatherbound pilgrims, with its sunny yard lying on a steep green slope facing the south. The old church

is so near the shore that in wild storms the sea beats against the churchyard-wall, and the spray flies right over the double-isled church, and on to the houses beyond. The Manx Shearwater breeds within the confines of Lleyn; on Bardsey Island, for instance, whence two birds were afterwards sent to me by a man who had mistaken my instructions. But I had the pleasure of liberating them in Abersoch harbour, and of seeing them go safely out to sea with their easy ghostly flight. Moreover, I found two birds on another island, in their burrows with their eggs. The burrows were in a steep grassy slope immediately over a much steeper rock falling to the sea; so that the birds on emerging could easily take wing. The holes were about five feet deep, and turned, shortly after entering the ground, sharply to the left, and ran parallel to the shore. At the end of each burrow was a mass of short dead grass mixed with bits of Shearwater down, forming a nest; but whether this material was collected by the Shearwaters or by Rabbits before the former took possession, I cannot say. The birds bit hard and savagely, and also scratched; and, armed as they are with a hard and sharp curved end to their bills, and very sharp claws, I should think they were quite capable of making it unpleasant for a Rabbit. I put a bird down on the glassy slope, and found that it rose fairly well. As it went away, low over a quiet sea, the narrow wings flapped with slight and easy strokes, which were continuous as far as I could see the bird. It was quite a different style of flight from that pursued by the Shearwater when seeking for food, *viz.* a few flaps and then a glide on outstretched wings. I took the opportunity of noting down the following description of the soft parts:—Tarsus and part of toes pink; the back of it from the heel down to the upper joint of the toes, the whole of the outer toe and two spots on the inner and middle toes (upper surface), the edges of the web, and nearly all the under surface of the web and toes, blackish. Claws dark horn or blackish. Inside of mouth pale flesh-colour. Lower mandible, save edge and tip, light bluish horn, the rest and the upper mandible dark horn. Iris dark brown.

OBITUARY.

JOSEPH ABRAHAMS.

MR. JOSEPH ABRAHAMS, the well-known and widely-respected Naturalist-dealer, was the son of Mr. Isaac Abrahams, of Leeds, in which town he was born on June 26th, 1839. When only sixteen years old he visited Victoria as one of the pioneers of the gold-mining industry of the Bendigo and Ballarat goldfields, and was the owner of the first miner's right to dig for gold. It therefore was not until his return to England in 1861 and his succession shortly afterwards to the business of his father-in-law, Moses Nathan, that Mr. Abrahams commenced his researches into the minute and yet important characters, the knowledge of which raised him far above the level of the ordinary bird-dealer.

Although almost entirely self-taught, it is no exaggeration to say that in the sexing of birds no man was his equal; he could unhesitatingly pick out a pair of birds of any imported species with such accuracy that, under favourable conditions, nesting would be almost a certainty; his eye became so trained to the differences of male and female in birds of identical plumage that, in ninety-nine out of a hundred cases, he would sex them at a glance. In the case of the Parrots, however, this was not always possible; but having devoted five years to the preparation of skulls from birds of which he had ascertained the sex by dissection, he accumulated such a mass of material that he was enabled to discover a well-defined constant sexual distinction, enabling him at all times to tell the sex of a Parrot whilst apparently only tickling its face. Not satisfied with this structural difference alone, which was not always pleasant to ascertain in the case of vicious and spiteful birds, this indefatigable student proceeded to note the colour of the irides, and ascertained that, in the genus *Chrysotis* at any rate, the iris in the female was decidedly paler than that of the male. The sexes of Love-birds and Budgerigars, apart from colour-differences, he usually ascer-

tained on dull days by letting each bird in a consignment bite his fingers; every cock pinched, but every hen drew blood: a pleasant experience truly, but fully confirmed by the scarred condition of this enthusiastic naturalist's fingers!

Kind, genial, generous, it was impossible for a man like Mr. Abrahams to keep his knowledge to himself. Any of his friends who really wished to learn could benefit by his experience; he would not merely answer a question, but would compel the enquirer to discover the answer to it for himself. If asked how he could tell the sexes of two birds exactly alike in plumage, he would take his net, catch a pair, hold them close together, and ask you if you could not see a difference; if you hesitated, he would point out that, having nothing else to guide it, a bird must be guided (as we generally are in the case of the human species) by the face. Thus he led up to the ascertained constant character, and when it was mastered, he would say, "Right! Now you will never forget it."

Mr. Abrahams died from peritonitis, following an operation, at the age of 62, on Friday, March 8th, leaving a blank which will not be easily filled.

A. G. B.

NOTES AND QUERIES.

MAMMALIA.

Observations on the Noctule (*Pipistrellus noctula*).—In the interesting observations of my friend Mr. C. Oldham upon this species (*ante*, p. 51), he says that "it may be that the period of activity is not limited to a short vespertinal flight of from one to two hours, and the Bats leave their den again before daylight; but I do not think so," giving such conclusions from the actions of a Noctule when in captivity. Personally it had not occurred to me but that a matinal as well as a vespertinal flight was at least not uncommon, but, owing to the early hours in summer when such observations have to be made, it requires more than an ordinary enthusiast for the purpose; hence it is probable that two instances only recur to my memory. Of these two specimens were observed some years ago flying through the glades of one of the woods in Warwickshire during the early hours of the morning; and in the other instance I can refer to a note taken at the time—"Tempsford, Bedfordshire, 25th May, 1893, about 4 a.m., several Noctules observed on the wing." These, I well remember, were taking one direct line of flight, evidently returning to their sleeping quarters.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Bank-Vole in Sussex.—I send you a small animal which was killed in my garden to-day (March 16th). It appears to me to be a Bank-Vole (*Microtus glareolus*); if such is the case, perhaps the record thereof in 'The Zoologist' may be of interest, as I do not see many occurrences noted in Sussex. — H. MARMADUKE LANGDALE (The Vicarage, Compton, Petersfield).

[The specimen has been duly received, and is undoubtedly *Microtus glareolus*.—ED.]

Black Rat in Great Yarmouth.—During the past winter the Black Rat (*Mus rattus*) has made itself exceedingly obnoxious to several provision dealers in the town. Many have been killed by traps, dogs, and cats, but the survivors profit by the lesson, and occasionally shift their quarters, or refuse to be captured. After receiving several last February, with two or three of the subspecies *Mus alexandrinus*, the supply suddenly ceased at a certain grocer's stores, and the Brown Rat (*M. decumanus*) made its appearance. The Black Rats had apparently fled, and were swarming in

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a neighbouring dwelling. At two or three stores I have lately been shown rows of empty jam-jars, as clean-licked as if legitimately emptied and washed, the thin covering being no protection.—A. PATTERSON (Ibis House, Great Yarmouth).

AVES.

Robin in Shetland.—I find that the Robin I recorded (*ante*, p. 106) was not picked up dead, but flew into a fish-curing establishment during a north-west gale, with snow, and died after being kept in a cage for two days. My informant adds that a pair of Redbreasts nested in a garden at Scalloway four years ago, and that he saw the birds and eggs; the latter appeared to be a little larger and whiter in ground colour than Twite's eggs.—O. V. APLIN (Bloxham, Oxon).

I note that a specimen of the Redbreast (*Erithacus rubecula*) was picked up on Mainland, Shetland (*ante*, p. 106). Though by no means common, this little favourite may be seen here every winter, perhaps tempted by the plantation close to the house to remain, in spite of our inhospitable climate. — T. EDMONDSTON SAXBY (Halligarth, Unst, Shetland).

Variety of Pied Wagtail (*Motacilla lugubris*).—At the end of last August a peculiar variety of this pretty species was obtained not far from Ringwood, on the Dorset border. At a casual glance it appears to be of a uniform dirty creamy white, but on closer inspection it is seen that the upper parts are darkest, especially the crown of the head; belly dirty white, with an indistinct yellowish patch on breast. All the larger feathers both of wings and tail have white shafts, rendered more conspicuous by the adjoining filaments being darker, shading almost to white on the edges. Outer tail-feathers pure white as usual. Legs and beak pale brown, eyes normal.—G. B. CORBIN (Ringwood, Hants).

Nesting of the Jackdaw.—Mr. Steele-Elliott (*ante*, p. 70) calls attention to an instance of *Corvus monedula* building open nests in spruce-firs. In this district, strange to say, the exception just quoted is not by any means uncommon, and a large number of the local birds repair yearly to the spruce-plantations for the purpose of breeding. Many of these "rookeries" are of considerable size, and contain, some of them, from forty to eighty pairs of birds. The nests—for the most part compact and strongly built—are placed about three-quarter-way up the tree, and, as a pair will use the same nest for many consecutive seasons, the accumulation of sticks and rubbish is often enormous—sufficient, in many instances, to fill a large wheelbarrow. In the case of these larger nests, the hollow in which the eggs are laid is of great depth, but is comparatively shallow if the nest happens to be of recent construction. In the early spring

the Long-eared Owl will often make use of one of these nests, and rear its young in the midst of the chattering colony. A still more remarkable divergence from the usual nesting habits of *Corvus monedula* can be seen in a heronry not far from St. Andrews. In this case the Jackdaws, by fair means or foul, have taken possession of many of the Herons' nests, which are built near the top of some very tall larches. When I last visited the place the Herons had, most of them, disappeared—partly owing to many of the nesting trees having been blown down, and partly, I suppose, to the unwarrantable invasion of their quarters by the Jackdaws. I am aware that Jackdaws do occasionally use the lower part of a large Rook's (or even Heron's) nest as a breeding-site, but I have never heard of another instance of actual appropriation such as I have just given.—A. H. MEIKLEJOHN (Kinloch House, St. Andrews, N.B.).

The Early Life of the Young Cuckoo.—The early stages in the life-history of the young Cuckoo are, as is well known, very interesting, and I hope the following authentic particulars may be found of interest and service:—The egg was found in a Hedge-Sparrow's nest at Potton End, Hemel Hempstead, Herts, on May 17th, 1900. The nest was placed at the bottom of a large disused gravel-pit, overgrown with furze, broom, and brambles, and was about eighteen inches from the ground. It contained three eggs of the Hedge-Sparrow and one of the Cuckoo. On May 29th the Cuckoo and two of the foster-parent's eggs were found to be hatched, and the young Cuckoo was observed to be asserting himself conspicuously even at such an early age. Only two days had elapsed (May 31st) before the young Cuckoo started, and finished, the shovelling-out process. One egg and one young Hedge-Sparrow had just been toppled out of the nest by the Cuckoo with the aid of its hollow back, which is so well suited for this purpose. The remaining young one could not be found high or low, and one wonders whether the voracious young culprit devoured it, or whether the foster-parents carried it away from the nest? The nest was next visited on June 11th, when the Cuckoo was about fourteen days old. It had made great progress since the last day of May, and the small nest of the bird under whose care it had been placed was quite insufficient to hold it comfortably. Three days after our last visit (June 14th) we found the Cuckoo out of the nest and screeching, when it was about seventeen days old. We thus arrive at the following interesting information:—

May 17th.—Nest found containing Cuckoo's egg and three Hedge-Sparrow's eggs.

May 29th.—Cuckoo's and two of the Hedge-Sparrow's eggs hatched.

May 31st.—Cuckoo ejected the other occupants of nest. One young Hedge-Sparrow missing altogether.

June 11th.—Cuckoo the sole occupant of nest, and fully fledged.

June 14th.—Cuckoo out of the nest and screeching.

It may be interesting to state that I have a series of excellent photographs illustrating the various stages described above, which will be subsequently published.—W. PERCIVAL WESTELL (St. Albans, Herts).

Varieties of the Dunlin (*Tringa alpina*).—Referring to the communication upon this subject by Mr. J. Backhouse (*ante*, p. 91), as far as I have been able to ascertain, no Dunlins of the larger variety stay in our part (North Yorkshire district) to breed. In 1899 I found a clutch of four eggs of *Tringa alpina* on the south bank of the River Tees, this being the only occurrence recorded of the Dunlin breeding there. The parent birds belonging to this nest were, I found, those of the smaller variety. For years I have sought to procure in this district an example of the large variety in good summer plumage, but have hitherto failed to do so. In early August I have shot, on the Humber, the Tees, and the Northumberland coast, several Dunlins, but invariably found them all of the small form, which is known to breed with us. Towards the latter end of August I have obtained the large form of Dunlin, which had by that time lost most of its summer plumage. A good specimen of the small variety in summer plumage can be readily procured on the coast in spring, but the large forms seem to leave us before they attain their full nuptial dress. I am, of course, aware that a very considerable range exists in the quality of the summer plumage of shore-birds, and also of the exceptions which occasionally take place. For instance, I have in my collection a Golden Plover in perfect summer dress, which was shot Feb. 22nd, 1900; and also a Grey Plover in full breeding plumage, shot Sept. 2nd, 1899. Both these birds were procured near the River Tees. The disappearance of the larger variety of the Dunlin during the months of June and July seems to lead many people to suppose that with us in Yorkshire they are only migratory. I have found several nests of the Dunlin on the uplands of the North of England, and from close observations always observed them to belong to the smaller race. Out of the individual Dunlins found on the Yorkshire coast during June and July, I have never been able to observe a single representative of the large form.—STANLEY DUNCAN (Redcar, Yorks).

Wildfowl on the Hampshire Avon during the Winter of 1900-1.—That the number as well as variety of Wildfowl frequenting this neighbourhood have decreased, when compared with many years ago, is an undoubted fact. The comparative mildness of some winters is perhaps one of the causes for this decrease, but other agencies must considerably help in the diminution. It matters not what the temperature of the season may be, the immense flocks of Wigeon and Teal are never seen as they were formerly,

and some species, as the Goosander and Pochard, are usually absent altogether; the former beautiful species was never abundant, but the latter was once killed in some numbers. It is true the Teal, years ago, often nested in the Forest or in the valley of the Avon, but not in such numbers as to produce the enormous flocks which used to "swish" over one's head in the winter twilight; and I recollect an old sportsman once killing six Pintails at a single shot. No doubt the population has grown in the immediate neighbourhood, and we are well aware that bricks and mortar are not conducive to the presence of Wildfowl; and it may be that the lights at eventide from the various habitations which have sprung up along the seaboard from Bournemouth to Lymington often scare away the sea-loving species, and prevent them from ascending the river as they formerly did. It must not, however, be inferred from the foregoing remarks that Wildfowl generally have become *scarce*—only in a comparative sense—except with one or two particular species; and even if the mildness or severity of the weather be taken into account, no hard and fast line can be drawn, as some species are very uncertain in their occurrences, under what may be thought favourable circumstances—the Bittern is a case in point. Although such species as the Shoveler and Pochard are irregular in their visits, yet both are said to occasionally nest in the locality—in fact, last summer a pair of Shovelers were observed in two different places throughout the season, and yet, strange to say, I knew of but one (a female) having been killed during the whole winter upon the part of the river of which I am writing; whereas in the corresponding season of 1899–1900 I heard of at least a dozen having been shot. As far as I am aware, not a single Bittern was seen in this immediate neighbourhood, where in the previous winter, I am sorry to say, several were slaughtered.

The season just ended has been rather exceptional, as the following list will show; but it must be borne in mind that a considerable number of the Wild Duck (*Anas boschas*) and its allied varieties were reared by hand, and set free when able to take care of themselves, which no doubt helped to swell the numbers of that particular species, although many of them wandered to other parts of the river and were killed. The portion of the river about which I more particularly write would, in its windings, include some four miles of water, and the following species were shot, *viz.*:—Wild Duck, 700; Wigeon, 102; Teal, 94; Tufted Duck, 8; Golden-eye, 1 male (immature); Pintail, 1 male; Gadwall, 1 female; Goosander, 1 male (immature); Coot, 143; Moor-hen, 74; Snipe, 45. On another shooting a little farther down the river representatives of most, if not all, of the above species were met with, besides a few flocks of Pochards, from which several birds were killed, and at least two female Smews, and one female Shoveler, which I saw; and I am informed of some kind of Diver, possibly a Red-throated, having been

shot, and four or five "Wild Geese" being seen, but I know not of what species; and I have been unable to obtain statistics of the other species killed on this shooting. Of the more uncommon species, most of those killed were, as is usual, in immature dress; but a few of the Pochards were especially fine, both in flesh and feather. Consequent upon the presence of the Wildfowl several Peregrine Falcons were in attendance, and I was told that on one of the day's shooting three of these noble birds were visible at the same time, and, I need not say, that death was meted out to two or three during the season. As a proof how tenaciously this bird will cling to a spot where food is abundant, the following fact will illustrate:—In the early part of the season a Peregrine Falcon was observed on various occasions taking toll of the Teal, &c., and eventually it was caught in a trap placed near a partly devoured quarry; the Falcon, however, managed to escape, leaving one of its legs in the trap, broken high up into the feathered portion. But with all its mutilation it still haunted the same locality, and some six weeks or two months later, when the "stump"-leg was completely healed, it was shot almost on the same spot as it had been trapped. It does seem a sin to kill these grand birds, for who that has seen one dash like "a bolt from the blue" amongst a flock of Teal in mid-air, when the word "scatter" is weak to describe the commotion; or watched the manner in which the Falcon tries to prevent its quarry, be it Duck or Teal, from descending into the stream below—who, I say, can forget the occurrence, although the drama was performed in less time than it takes to describe it?—G. B. CORBIN (Ringwood, Hants).

Rare Birds in Nottinghamshire.—Great Grey Shrike (*Lanius excubitor*): When driving over the forest to Edwinstowe, on March 13th, I saw a Shrike on a thorn-bush in the heather, and, as it was under one hundred yards, Mr. Aplin and myself had a good view of it through our glasses. On leaving the carriage and walking towards it, it flew to another bush, and again to another; it had a low dipping flight.

Snow-Bunting (*Plectrophenax nivalis*): Within two hundred yards from seeing the Shrike, we almost drove over a very beautiful specimen of this bird; the horse was within a few yards before it rose, when its beautifully marked plumage attracted our notice. We watched it for some time feeding on the road; it moved by short runs, then a shuffling sort of run-hop, it was very tame, and at last flew round the carriage and settled on the road behind. This is the first Snow-Bunting I have seen alive in this county.

Goosanders (*Mergus merganser*): The same afternoon we saw, amongst other Ducks on Thoresby Lake, seven of these fine Ducks, three of which were old males in grand plumage. I might add that there were many hundreds of Ducks, &c., on this fine sheet of water, which comprises ninety acres in the middle of a two-thousand-acre Deer-park.—J. WHITAKER (Rainworth Lodge, Notts).

Weights of Birds.—Mr. Bradshaw's notes upon the weights of birds (*ante*, pp. 111, 112) are very interesting. I have from time to time made note of birds more than usually heavy; some of these are as follows:—

September, 1880.—Great Snipe, 7 oz., $7\frac{1}{4}$ oz., and $7\frac{1}{2}$ oz. (Lubbock, 'Fauna of Norfolk,' mentions one of 10 oz.) Very poor example in Sept. 1900, 5 oz.

November, 1881.—Grey Plover, 10 oz. Lapwing, 10 oz. Common Snipe, 5 oz. (I weighed another, Nov. 1891, $6\frac{1}{4}$ oz.). Woodcock, 11 oz. (I weighed another, Jan. 1890, 15 oz.).

December, 1899.—Curlew, 2 lb. 4 oz. (*ante*, p. 104).

December, 1900.—Golden Plover, $9\frac{1}{2}$ oz.

December, 1899.—Stock-Dove, $15\frac{1}{2}$ oz. (*cf.* Zool. 1900, p. 534).—
A. PATTERSON (Ibis House, Great Yarmouth).

REPTILIA.

Notes on the Leopard Snake in Confinement.—For the last twelve months I have had in my possession a specimen of the Leopard Snake (*Coluber leopardinus*). Although declared by most people who are interested in Snakes to be a shy feeder, and also a delicate species, my specimen has up to the present proved quite the reverse. I thought during the present winter I would allow it to hibernate; so about the end of October, during a spell of rather severe weather, I packed it away, together with a number of English Ringed Snakes (*Tropidonotus natrix*) and an Æsculapian Snake (*Coluber æsculapii*), and placed them in a rather cool situation. In a month's time I unpacked them to see if hibernation had taken place, and found it had done so in the case of the Ringed Snakes and the Æsculapian, but the Leopard Snake still seemed quite lively. As the weather was now milder, I placed it in a vivarium, and supplied it with water, of which it drank freely. All through the winter it has been in a room, in which there is no fire or any kind of artificial heat of any sort; but, although we have had spells of very severe weather, it has not hibernated, and most of the time has remained in a lively condition. During the last five months it has not eaten anything, though I have seen it drinking several times. Its food during last summer consisted of tame Mice, of which it has eaten sixteen or eighteen, the largest meal consisting of four half-grown Mice. Its last meal, which consisted of two Mice, it disgorged about five days afterwards. In most cases the Mice were held in the coils till dead, but on several occasions they were eaten alive. The first time I saw it feed it constricted one Mouse, and held it in its coils whilst it caught and devoured a second one, which was swallowed alive. During the time it has been in my possession it has changed its skin twice at intervals of seven or eight weeks; in each case the cuticle was cast entire. My specimen is very gentle and

tame, never attempting to bite; and, as far as my own experience goes, this species seems to be a very suitable inmate of a vivarium. — B. J. HORTON (Sparkbrook, Birmingham).

PISCES.

Notes from Great Yarmouth.—Since the practical failure of the local trawling industry our fish-wharf has offered few attractions for the ichthyologist. Very few smacks now land fish here—indeed much of the fish on sale in the local shops is brought to Yarmouth *viâ* Lowestoft, some of our fishmongers finding it answers their purpose better to proceed thither. On May 5th, 1900, I caught on Breydon a “double” Flounder (*Pleuronectes flesus*), corresponding exactly with the figure given by Couch (vol. iii. p. 197). The fins, curiously enough, were spotted with red, after the fashion of a Plaice. Both sides were dark brown in colour. A beautiful green variety of the Ballan Wrasse (*Labrus maculatus*) was landed on the fish-wharf, June 11th, 1900. During the Herring fishery but few strangers were observed, two Porbeagles (*Lamna cornubica*), of moderate size, being the most conspicuous. A 22-lb. Salmon, out of season, but in fine condition, rolled itself up in the Herring-nets, and was brought to port on Oct. 13th. A Lump Sucker (*Cyclopterus lumpus*) was taken on a hook—an unusual circumstance—in the harbour on Oct. 14th. Some of the Herrings imported from Norway run very large, but are unpleasantly bony and indifferent eating. I saw one on Dec. 5th measuring $15\frac{1}{2}$ in.; three others of similar length on Dec. 11th. One, 15 in. long, was $7\frac{1}{2}$ in. in girth, and weighed $14\frac{1}{2}$ oz. A 16-in. “double” Brill (*Rhombus laevis*) was brought in early in January, 1901, the *eye-notch* being well formed; and a normally shapen but double-coloured Smeared Dab (*Pleuronectes microcephalus*). A 12-in. example of the Streaked Gurnard (*Trigla lineata*) was procured on Feb. 18th. It is astonishing how large a prey the Whiting dares attempt to commandeer. Noticing the tail of a Whiting protruding from the mouth of another, I pulled the victim out, and laid them side by side, measuring them individually at $9\frac{1}{2}$ in. and $7\frac{3}{4}$ in. This was on March 5th. On March 21st I was asked to settle a dispute relative to the identity of a “sea-monster” brought in by a fishing-smack. It was the ugliest example of a Conger-Eel (*Conger vulgaris*) I ever saw; its “dead-green” eyes contrasting against its dark-skinned carcase gave it a most repulsive appearance. I found it to measure about 7 ft. 6 in., with a weight of 92 lb. The thickest part of the body was as big round as an ordinary bucket. This is the largest example brought into Yarmouth of which I have any record. Some 9-in. “spring” Herrings brought in about the middle of March contained well-developed roes. — A. PATTERSON (Ibis House, Great Yarmouth).

THE ZOOLOGIST

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AN OBSERVATIONAL DIARY OF THE HABITS—
MOSTLY DOMESTIC—OF THE GREAT CRESTED
GREBE (*PODICIPES CRISTATUS*).

By EDMUND SELOUS.

April 27th, 1900.—I noticed to-day a pair of these birds swimming about together on a large sheet of water some miles from where I live. I did not then, through the glasses, see anything resembling a nest.

May 3rd.—This morning one of the birds is sitting upon a large structure of weeds which I imagine to be the finished nest. It would seem, however, that some touches are added even after incubation—or, at least, the laying of the eggs—has commenced, for now the other bird is swimming to the nest, and, when within a little distance of it, dives, and, coming up with some weeds in its bill, lays them at the edge of it. He then swims out to the same place, dives again, and returns with some more; and this he does five times in succession. I now go nearer, and, though I am still a considerable distance off, the bird upon the nest leaves it and swims away. I sit down against a tree, and she soon returns, and, giving a long lithe leap out of the water on to the mass of weeds, again settles herself down upon it. She sits quietly, and must certainly be either incubating or in process of laying the eggs. Yet every now and then she bends the head forward, and with the beak arranges, or at least moves about, the

weeds edging the structure. From her sitting so steadily, and her haste to return to the nest, I have little doubt that this is the female bird, and if so, as the male dived for weeds and brought them to the nest in the most accustomed manner, I imagine that both birds help in the building of it, for one can hardly suppose that the male alone does so. Whilst sitting the bird has her neck bent back between the shoulders in an easy curve, the head being just raised above the back, and held straight, with the beak pointing forward. On any alarm it is stretched a little forward, or raised straight up. When the female has sat like this for about an hour, the male again swims up, and, diving, brings some more weeds to the nest. He does this two or three times, bringing once a large green stalk of some plant or lily, and again quite a mass of weeds. The birds then, I think, arrange this a little together, but not much in this way appears to be done, and what is, principally by the male. There is then a short interval, during which the male swims about at a moderate distance from the nest, returning to which he now, to my astonishment, springs upon it, and, raising himself upright, or almost so, on his legs, which are placed as far back as a Penguin's, he pairs, or attempts to pair, with the female. If successful, the act is of extremely short duration, and, taking the water again, the male bird swims away. He returns, and again swims away several times at rather longer intervals than formerly, sometimes, but not often, bringing a little weed in his bill. During this time the female bird is occupied a little, but not, I think, very much, in arranging the materials of the nest. She is moving her head and neck freely about; but, if I mistake not, when she does this she is only preening herself. On one of the returns of the male bird, I notice that she bends down her head so that the beak, I think, touches the water, lying thus flat all along the nest; and whilst in this position the male swims to that side of the nest towards which her tail is turned, and seems two or three times to be on the point of leaping up again in order to pair as before, which, however, he does not do, but again swims off. The pairing, then, of these birds takes place on the nest, which, it would now seem, is not completed; nor can I think, under these circumstances, that the eggs are yet laid, or even that the hen is sitting to lay them. It would appear, that

however the nest may be built during its initial stages, the hen bird at one period sits on a mass of weed whilst the male brings fresh weeds to it. Whilst swimming in the neighbourhood of the nest the male bird was constantly preening himself, not only the neck and upper parts, but the whole ventral surface, to do which he turned himself sideways in the water, thus presenting to the view a broad expanse of silvery feathers. The above took place, roughly, between 6.45 and 8.45 a.m.

I return about 5.30 p.m., and find things much as before; one bird still sits on the nest, the other floats about rather than swims in the neighbourhood, at just the same distance. His head, now, is flung right back upon his back, at almost the middle of it, and the white neck and upper part of the breast gleam like silver in the sun. Occasionally he preens himself, when a greater surface of silver becomes visible; but a little of this is exposed, as he moves, all along the water-line. After a little the sitting bird turns round in or on the nest, so that her back is towards me. In the morning she was sideways to me in two directions, thus making three points of the compass, turned to which I have seen her sitting. I now walk all round the lake, and, coming at last to the nest—now of course empty—which is just off the shore, I find that it has one egg in it, partially covered over with the weeds, &c., of which the nest is composed. Assuming that this egg was laid not later than the preceding night—which is likely—then the pairing of the birds took place not only on the nest, but whilst the female was actually sitting on the egg, which to me is surprising. Both birds are now swimming about together, and when just in front of each other one dives and brings up some weed, which they both discuss in the friendliest manner, pulling it about, and perhaps eating a little, though of this I cannot be sure.* Shortly after this the male bird swims to the nest, and, after swimming round about it a little, is evidently preparing to leap up. This he suddenly does in a very lithe and lissom manner, with neck bent yet extended, seeming to dive

* The Great Crested Grebe is certainly a fish-eater, but, as its relative the Little Grebe, or *Dabchick*, feeds largely on weeds, it may also do so to some extent. The *Dabchick* may also feed upon small fish, but I have never been able to see it with an unmistakable one in its bill. I have seen it dive and bring up weeds, which it has then eaten.

upwards, the long beak spearing the air. The sudden revealment of his lithe wet outline seems to diminish his size, and he becomes in a much greater degree long, lank, and snaky, like a Shag. For a moment—as he alights—he stands almost as upright as a Penguin; then, bending snakily forward, with legs straddled wide apart, he waddles a step or two along the raft, seeming to feel for the eggs with the feathers between his legs; then sinks forward on his breast, and sits at ease with his head drawn down upon his back. The female bird now swims much farther afield—too far for me to make out what she is doing, but probably she is feeding. I have now seen plainly that when preening these birds turn very much on one side, thus showing in a gleam—bright to dazzling—the silver of the breast, or rather ventral surface, almost in its full extent. I leave at seven, there having been no further change on the nest.

May 4th.—At 5 a.m. I find the male bird on the nest. As I approach the tree from which I watch, and whilst still a great way off, he leaves it, but keeps close about, sometimes swimming a few yards away from it, then turning, diving, and emerging again just beside it. Then pressing against it with his breast, he cranes forward his neck, and looks into it, then coasts round it a little, again cranes his neck, and in a moment makes his lithe Cormorant leap, and is on it. The spring is very quick and sudden, yet smooth and without splash, suggesting that the bird has been oiled, or that he passes from oil rather than water. He stands but a moment—just one flash of a Cormorant—and then sinks flatly and smoothly down.

5.50.—The female, who has been before invisible, is now all at once there, and approaches the nest, swimming to it quietly and placidly over the sun-bathed mirror of the lake. It is clearly the female, for the other, the male, is considerably larger, and has a larger crest. Both birds remain quietly by the nest for a minute or so, the male turned sideways in the water so that full three-fourths of his beautiful silver breast is exposed; and as he preens it, assiduously spearing into the thick fur of feathers with his long finely-pointed bill, one of his finned feet or paddles is often raised above the surface of the water, and beats it idly. The female then takes her place on the nest, but her leap is not so lithe and subtle, so instinct with nervous energy, so

Cormorant-like as the male's. The male floats or swims about in the neighbourhood as before, continually preening himself. Sometimes he will make a little swift gliding leap up in the water and smartly shake his wings. This upward motion is very graceful and snake-like, for, as the body rises, the long neck, which seems but an extension of it, curves backwards, upwards, and again forwards as the bird sinks back on the water, the whole motion much resembling the quick forward glide of a serpent. The male bird makes now, at short intervals, four approaches to the nest, and at each of these the female lowers her head, and, with neck stretched forward, lies all along the nest, obviously prepared for and expecting his marital attentions. Each time, too, the male swimming to the right place at the nest and craning his neck over it, seems on the point of springing up, but does not do so. He preens the feathers of his neck, again seems about to spring, preens again, and swims away. After the fourth return he swam to a good way off, and remained some time away, after which there were three more approaches, when the same thing took place. The female must have put herself in position on the nest at least a dozen times, and would often slightly raise her head and look round at the male, then again lower it as before. On no other occasion have I seen her lie thus with her head and neck stretched straight out, and flat along the nest. I wish to make it quite plain that these actions of the two birds, seen, practically, by the aid of the glasses at a few yards distance, could admit of no other interpretation than that which I have placed upon them: so that, taken together with what I have already recorded, they seem to show that the nest is the habitual pairing-place of these Grebes.

After the seventh failure the female came off the nest, and the male bird shortly took her place. This was at 7. She then swam right away, and when I left about 7.40 she had not returned. On the third return of the male bird to the nest he dived, and came up with a large lump of weed in his bill, which he brought to the nest. On the fourth there was an incident with a Moor-hen. The latter stood just on the edge of the bank, which formed an abrupt grassy slope, and its presence seemed resented by the male Grebe, who swam towards it in a hostile manner. The Moor-hen retreated a little way up the bank, and

the Grebe returned to the nest; but, on the Moor-hen's again descending, he again swam towards it, this time in a little threatening rush, driving it right up the bank. This took place yet a third time, and then, before descending the bank again, the Moor-hen walked some way farther off along the top of it. This, it must be remembered, was not under the actual stress of an attack, but deliberately, and though it was evident that the particular spot off the water which the Moor-hen was thus leaving was the particular spot where it wished to be. Two attempts to return and a previous lengthy occupation are sufficient to show this. It is in little everyday things like this, I think, that one can best trace the working of reason in animals. Elaborate experiments in which they are placed under quite artificial conditions are of little value. I have read a whole series of such where Cats and Dogs were put into boxes which opened by a certain mechanical contrivance, and it seemed to be expected of them that they should calmly examine the interior with a view to piercing into this, the result, of course, being held to show that they had no reasoning power. Probably as long as they were there, their mental distress and confusion was such that they had not. When Foxes, however, and Wolverines walk round traps and examine them (as to which see Professor Romanes' 'Animal Intelligence') they *are* calm, and have their wits about them. Moreover, they have had time and that kind of vivid experience which impresses things on the *mind*—factors which, in the wooing of reason, are found sometimes to be almost as much needed by men as by animals. There is too much tendency, I think, to go by experiments made in the study rather than by those which nature may be said to make. The reason of this is not difficult to understand. Men, as a rule, are more comfortable in their study, and they admire their own or each other's ingenuity. But the greatest ingenuity can hardly ever give what is the most absolutely essential factor in all experiments where animal psychology is concerned, *viz.* natural—or at any rate accustomed—conditions. I therefore think that to watch an experiment made by nature is in nine cases out of ten much better than to make one oneself.

The Moor-hen seemed to know that the Grebe would not follow him up the bank, for always, though he might be a little

more or less frightened away, one could read in his actions the idea that there was no further need for exertion when he was once out of the "reach" of the latter's long neck. He thus took the minimum of trouble necessary to avoid the danger, and this I have often observed with birds. Moor-hens, though so pugnacious, know well their limitations, giving instant way, as a rule, even to a Coot when attacked by one. However, so do the weaker to the stronger ones amongst themselves.

Seen now swimming close, the Great Crested Grebe shows not a particle of his silver feathering—I speak, of course, of the under surface—above the water-line. In a wind the handsome crest or double tippet is being constantly blown back round his head and face, giving him a funny dishevelled appearance. It is of a fine orange* and black, whilst from amidst it projects the thin white face with the long sharp-pointed spear of a beak. The long serpent neck is brown on the back, white and silver-white on the belly, and, with the swelling crested head, makes the bird look like a Water-Cobra. His dive is sometimes quite informal, just lazily spearing the water, sinking a little in it before he spears it; sometimes it is with the right Cormorant leap upwards and then downwards, though much less vigorously carried out. Sometimes again the long straight-stretched neck with sharp pickaxe beak shooting out at a right angle sweeps down without a curve. Certainly one of the most ornamental of water-birds, and that it should *require* protection shows us to be still inappreciative savages.

He has just come up with a good-sized fish in his bill, which he shifts about till he gets the head downwards in it before swallowing. Yet fish abound in this water, and were far more numerous, according to all accounts, in the Norfolk Broads in those days when the Crested Grebe was also—a remark which can be equally well applied to the Otter. No doubt when we import Sheep and Goats into a country infested with Wolves, the latter must be got rid of, but it is the height of absurdity to interfere between one indigenous wild creature and another. All that we have to do is to leave them both alone, and both flourish. The very existence of a preying species must show an abundance of the species preyed upon in exact proportion to its own, as is—or was—well seen in a country like Africa.

* Or perhaps, rather, chesnut.

Our real efforts should be directed against ourselves—that is to say, against the inordinate love of one thing in us at the expense of another. It *ought*, for instance, to be for all as it is for many, a greater loss never to see such birds as Kites, Buzzards, Peregrine Falcons, Ospreys, Eagles, Ravens, &c., than it is a gain to have a larger number of Pheasants, Partridges, Grouse, or Blackcock to the end of killing more of them; and it *ought* to be an infinitely greater pleasure not only to see a bird or other animal in life and nature, but even to know that it is so, than to hold it dead in our own poor possession. That this is largely not the case shows lack of taste, lack of imagination, lack of a true love of nature. Let us supply these wants in our proper selves, and “keep down” those redundancies which prey upon them, and the cruel extermination—now in active process—of so many beautiful and interesting forms of life will cease. By preserving our own “balance”—the proper proportion of our tastes and pleasures—we should be preserving that of nature. What, for instance, would not a proper balance of appreciation in women as between their own beauty and that of birds effect in favour of the latter?

Extermination is a real evil. The desire to check it is not mere sentimentality, as some writers seem to imagine. “Why,” for instance, asks Sir Herbert Maxwell* (and he intends the question as a *reductio ad absurdum*), “should not insects, which are preyed upon by birds, be as much protected as the birds?” Certainly, if it would be ridiculous to save some most beautiful butterfly from disappearance *at the hands of man*, it would be equally so to save a Humming-Bird or Bird of Paradise; but, as Touchstone says, “much virtue in your if.” It is marvellous how men, who would be in despair (yet not more so than myself) at the threatened destruction of some fine painting or piece of sculpture, can see with imperturbability the *artificial* extermination of a living work. I admit that, when we look at, say, the Laocoon, the Assumption, or a portrait by Rembrandt, it is difficult to bear in mind the relative proportions of human and divine genius, but reason should tell us how immeasurably superior are the works of nature to those of art. If we must love killing, yet let us not, even as pure egotists, tolerate *making to*

* I am quoting not the letter, but the spirit, and this from memory. If I misrepresent, therefore, I must apologise.

cease, for the more cessation the less killing in the long run—the end should sanctify the means.

May 8th.—At 1.40 p.m. find both birds off the nest, and I can see, through the glasses, at least two of the white eggs quite distinctly. There was no question of the birds having been alarmed by me, for I was much beyond the limit at which I have ever alarmed them before. It would seem therefore as if the birds did not cover their eggs in leaving when not disturbed. In a minute or two the male makes his leap on to the nest, and sits on the eggs. In coming up to the tree from which I watch, I do not this time disturb him. As usual, I soon lose sight of the female, who has swum right away.

1.40.—The female returns to the nest, swimming quietly up to it. I do not see her till she is there. The male then stands up, gives himself a preen or two with the beak, and takes the water, when the hen with hardly a pause jumps up. She stands a little, and moves the weeds about with her beak before settling down. The male, on leaving, goes to the bank, and (I think without diving) brings from it to the nest a small piece of weed. He then swims twice a little distance out, dives, and, coming up each time with a good beakful, brings them both to the nest, and the female afterwards arranges them upon it with her beak. Thus day by day, while the birds are sitting, the bulk of the nest is added to, and always, so far as I have yet seen, by the male bird.

2.—The male bird has also now gone a good way off, but I still see him on the water.

2.25.—The male back at the nest, and there is now more arranging of the weeds by the two birds together. After this the male swims off again, there being no change on the nest.

2.55.—The female leaves the nest, in alarm, I think, at an approaching boy in charge of a flock of Sheep.

May 17th.—Upon coming here to watch again I find the nest plundered and destroyed.

May 19th.—Coming again this morning, about 6.30 a.m., I see one bird swimming by itself in the neighbourhood of the destroyed nest, and farther off a pair of them.

After some time the single male bird swims to and meets the female of the other two, she having swum to him, leaving her

companion—a male in splendid plumage.* When the two birds meet they remain for some moments at rest on the water fronting each other, their heads and necks close together, whilst each *tâtes* the other's bill with his own. They then swim down to a part of the water nearer to me, followed by the odd male bird, who when the others pause remains near about them, having a somewhat "out of it" appearance. The accepted male, which I believe to be the one whose nest has been destroyed, now swims towards him with neck drawn in, head lowered, and bill pointing straight forward just above the water-line. All at once, and when still a little way off, he dives; a moment or two afterwards there is a sudden start and retreat on the part of the rival bird, the other one reappearing on the surface a little behind him. In a minute or two this happens again, and this time it is more pronounced, the start of the attacked bird being much more sudden, his retreat more alarmed and rapid, whilst his enemy emerges just where he has been, having evidently attacked him under the water. Once more, about half an hour afterwards, this mode of warfare is exhibited, if possible, still more clearly. During the interval the discomfited bachelor bird has remained alone near the bank where the destroyed nest has been, and the married couple now swim directly down upon him. The male is in advance, and as he approaches he again exhibits the angry mien, holding the head low, with the neck drawn in and the beak pointed straightly forward, looking like a stiletto. But he swerves from his course, and seems now to be swimming towards the female, who has glided out to one side, and rides at ease—a spectator—when he dives. This, however, must have been a ruse, for a few seconds afterwards the unhappy persecuted male not only starts, but rises in great confusion out of the water, and flies right away to a distant part of the lake. From the moment of his flight I watch for the reappearance of the other, and, sure enough, he comes up shortly in the place, or approximately the place, that has just been left vacant. He swims about for a little with the head still lowered, and in a proud sort of way; then, raising it, goes to the female, and there is now between the two the same scene of gratulation as before, but much more marked. They again front each other with their heads and necks almost

* Yet not more so than the other male. All three, indeed, looked superb.

touching, and keep moving them from side to side in opposite directions, their two beaks crossing each other and shooting out suddenly on each side of the two necks like sharp little daggers. At the same time they both utter a short, quickly repeated note of a clucking or clacking description, strongly expressive of content and gratulation—and this they did before, though I omitted to note it. It is thus evident that it is the habit of these birds when fighting to dive and attack each other under the water, and this habit they share with the Black Guillemot, and no doubt with other diving birds. Judging by the way in which the one bird flew off, he must, I think, have received a very effective spear-thrust from the other's beak.

I now think it possible that I was mistaken as to its having been the male which I first saw alone by the ruined nest that went through the first congratulation scene with the female. It does not seem likely that a bird so favoured and victorious should have allowed a third party to "consort" with its spouse, and afterwards, till the final discomfiture of the third bird, the pair were always together. I might have mistaken the two birds, as one, at least, was frequently diving, probably the other also, but I cannot now recall it clearly. It is even possible that there may have been a transposition of the two owing to such an attack as I have described, but which, not being quite so salient as the other ones, as well as quite new to me, I may have missed. Still there is nothing except what seems to me now to be the probability of the case which should make me doubt the accuracy of my observation. But we have this point which is interesting, that the solitary and defeated male remained during the interval between two attacks made upon him near the place where the nest had been, and this was where I first saw the supposed other male. Now, what should a new arrival know about this nest of two other birds? unless, indeed, he had destroyed it; and then his feelings would not be of such a nature as to prompt him to hang sadly about it. But now, suppose that he had indeed destroyed it, ousted the other bird, and supplanted him in the affections of his wife, then we can understand that other one lingering near the ruins of his home. That this should really have been the case seems altogether improbable, but perhaps the *possibility* is not quite excluded. It was on the morning that I

first found the nest destroyed that I saw for the first time this third bird. That some drama had taken place between the 8th and the 17th I cannot help suspecting, and I regret now extremely that I was unable to watch during the intervening days. However, what seems most probable is that the nest was plundered and destroyed by someone,* that the two birds then swam about all day on the lake, and that an unpaired male, seeing a female whom he thought might possibly be also free, approached her with honourable intentions, for which she never forgave him.†

May 21st.—Arrive at 6 a.m. The two birds are swimming together, and I at once notice a new nest in the same place as the other, which has been built since yesterday. It looks, through the glasses, as large and substantial as was the first. The birds swim about together as usual, preening themselves, &c.; but in about ten minutes the male, with a little turn towards the female, as though to ask her concurrence, starts towards the nest, swimming straight on without pausing, in a purposive manner. Soon he dives, and, coming up with weeds, continues towards it, and works at it for some few minutes without being joined by the female; so that I begin to think the male alone builds the nest. After a time, however, the female comes, and at once shows herself the more efficient of the two (though the male is also very efficient), diving more frequently, and bringing up larger masses of weed. Both birds now work together quickly and systematically, generally diving for each load of material, but sometimes—and especially the female—collecting it from the surface near the bank. They must have carried perhaps a dozen cargoes between them before I take out my watch. It is then 6.20, and in the next ten minutes they bring, together, twenty-five cargoes. The female then—at 6.30—springs upon the nest, and lies all along it in the way I have described, wishing evidently to receive the male. He, however, does not respond. She soon comes off again (in less than a minute), and the building continues with the greatest activity, as before. “*Fervet opus,*” and by

* The shepherd-boy, I may say, was half-witted, but this would leave him quite clever enough for the act.

† I have no doubt now that the bird I first saw by the nest was the male of the original pair, that the female going far afield—as she has often done—was courted by another male, and that this other one’s remaining afterwards near the nest was mere chance.

7 o'clock forty-nine more cargoes—thus making seventy-four within forty minutes—have been brought by the two birds.

The male now swims to the bank, and stands up upon the sedge and mud at the extreme edge of the water. After standing a moment or two he sits, but soon again rises, then sits and seems resting. Afterwards he again stands and preens himself a little. The female meanwhile continues to work by herself, and brings ten more cargoes to the nest before desisting. This would be towards 7.30, for there has been some pause after 7, and afterwards she has not worked so quickly, besides being alone. During the greater portion of this time the male, who has re-entered the water, has also been working, but, instead of helping the female as before, he is now carrying weeds to the bank where he has been standing and sitting. He swims out each time some little distance, and dives for them exactly as in building the nest. By 7.30 he has brought twenty-seven cargoes thus to the bank, arranging each one with his bill as at the nest. Then—at 7.30—he stands up exactly where he has placed the weeds—upon them, that is to say—having evidently been making a platform with them for this purpose. He shortly again takes the water, brings one more weed-load, and then swims away, joining, after a time, the female, who has by this time also desisted, and both birds now float idly on the water. I now walk along the bank to the nest, which I find to be twenty-three paces beyond the old one, and at another twenty-three paces beyond the new nest I find the little platform or foothold of weeds which the male bird has made. This is adjoining to and just on the extreme edge of the bank, where it is hardly above the water and more composed of sedge than soil. The nest is a massive structure, and seems to be anchored and kept in place by being woven, under water, in the growing weeds of which, uprooted, it is formed. Several long and water-logged sticks are also fixed amidst it by one end, the other end sinking down amidst the mud and weeds; so that they too help to hold it fast. I had several times seen the female, but not the male, placing and struggling with these sticks. One has, I may say, often to scribble very fast in order to keep up with the birds, and so must leave a few things to be added.

Now sticks, being usually pieces of floating spar from wrecks,

are stuck by the Shag amongst the mass of seaweed which forms its nest, and here it does not seem as if they could serve any definite purpose. May we not see in such things as this the origin—one of the origins—of the idea of ornament. Something felt to be necessary—large and conspicuous, but of no definite *use*—has, one may almost say, the elements of ornament within it, and even amongst ourselves, it is probable that many things are fiddled about and “arranged” as ornaments, with but a very slight æsthetic sense of them. Use passes insensibly into ornament, as one may see if one watches the laying of a cloth and setting out the things upon it. On independent grounds I came to the conclusion that these conspicuous bleached spars stuck amongst the brown seaweed of the Shag’s nest serve now as ornaments, yet surely we may see in them the survival of a habit, once of definite service, to a river-haunting ancestry who built their nests on the water, and thus helped to anchor them. The Shag is more marine than the Common Cormorant, and there are other species, if I mistake not, who live wholly or mostly on rivers. An inquiry into the nest-building habits of the whole family might prove instructive.

Revenons à nos “podicipes.” Judging by the insignificant appearance of the platform—made up of at least twenty-eight cargoes—and comparing it with the huge mass of the nest, one would say that the latter must be the result of thousands of similar loads. Yet I could see no trace of it yesterday, nor were the birds working at it that morning, at any rate after 6.30. Most birds that I have watched, build their nests almost exclusively in the early morning, nor did I ever see these Grebes do so at any other time.

This morning I occasionally saw both the birds swim with weeds to the nest, having one foot raised up above the surface of the water.

May 22nd.—Same place at 6.10 a.m., and find the birds building *another* nest a considerable way from the last—*i. e.* the second one—always in the same direction, and just off the bank. By 7 they had brought between them—as well as I could count—exactly one hundred cargoes of weed, and by 6.45, when a slight pause occurred, they had brought eighty-six. The last ten or twelve of the hundred were brought by the male only, who

continued to work thus alone for a short time afterwards; yet the nest, when I first saw it at 6.10, looked as large as the other, and as though it represented a great deal more weed than the birds had brought in these fifty minutes. They must, I think, have been working from earliest dawn. The male did not, this time, leave off nest-building to continuously build a platform, but on three or four occasions he varied the former by taking a cargo to a patch of very green and grassy-looking rushes, just off the bank, returning, then, to the nest and continuing to work as before. On the last of these journeys he brought a stick to the bank, and, having laid it down, he immediately stood up—I have no doubt upon it, as part of the platform. I had seen him standing there before, also, as well as sitting, shortly after I arrived. The male Crested Grebe therefore, at any rate, makes a platform of weeds, &c., at a little distance from the nest, on which to stand or sit during the building of it, and also probably during incubation. Both to-day and yesterday the female sometimes carried a very large mass of weed to the nest. Once yesterday her head and neck, as she dragged it, were pulled right back, and this morning her head was once almost hidden behind the mass she was holding. The male never carried quite so large a quantity, though his average was about the same, and he worked very quickly and eagerly. Generally he carried a longer and thinner piece, which would rest on his back and stream behind him along the water. To see him swimming thus draped, very quickly and straight as a die, to the nest was a pretty—indeed, a fascinating—sight. He would swim out from the nest, dive and emerge generally, if not always, with his head turned the other way—to it, that is—and swim back almost without a pause. He swam much faster than the female.

7.30.—I now notice the male bird making his platform or raft systematically, bringing cargo after cargo to it. He takes three or four (how many he may have taken before I caught sight of him I do not know), but now, at 7.35, both birds are at the nest again, and the female places a stick upon it.

7.40.—Male carrying loads to his platform again. He has carried, I think, two or three more, and now stands up, and then sits upon it in the same way as does the female on the nest.

7.43.—He is off again, and carries another load a little past

the nest, as though to take it to the platform; then hesitates, turns, and places it on the nest. The next bunch of weed he passes to the female, who takes it from him and deposits it on the nest, whilst he swims a little farther, and dives for more.

7.47.—Male taking a cargo to platform. He takes four in succession, then meets female at nest, and passes her a load as before, which, however, she allows to drop. One of the birds now jumps on to the nest, and sits there a moment or so; then off again. I think it was the female, but am not quite certain.

7.55.—The male is now again taking loads to his platform, and also to the nest; but he has taken some four to the former, only one to the latter. He then takes two more to the platform. I now again see the third Grebe in the distance, but he keeps aloof, and plays no part in the drama.

The morning's work seems now (at 8.10) to be finished, and I can only see one of the two birds a long way from the nest. I leave at 8.15.

This occasional hesitation of the male between the nest and his platform, as though he were in doubt to which to take his load of weed to, is a thing to be noted, for it may throw a light on the possible origin of the habit of making such a platform—that is, supposing such a habit to exist; but as to this, other questions now arise. Why should the birds, having almost completed one nest, have commenced making another? Let us suppose that, owing to restlessness at the destruction of the first nest, or, again, to what we may call a wandering of the instinct—which last a male bird might be more subject to in nest-building than the female on account of the habit having been more lately acquired by the progenitors of the former than of the latter, and being therefore less fixed—let us suppose that from either of these causes, or from some other cause, the male bird had wandered, and begun to deposit his loads in another place; then, the female, seeing him do so, might have followed his example, in which case what had seemed a platform made for a special purpose would have become another nest. On the other hand, let us suppose that the female is not to be led away by the unsteadiness of the male, and that she by persevering

brings him back, then we have the nest and a small collection of materials near it, which the male, having once begun, would be likely to add to to a certain extent, never getting it quite out of his mind, so to speak. His occasional hesitation between the two would be quite natural, as natural, I think, as most other hesitations either in man or beasts. It is not difficult, then, to imagine the inchoate nest being put to some other purpose, or even that it might be *either* so put, or become another nest, in the case of one and the same bird or pair of birds; or that some birds of a species, till the habit had become fixed in one or another direction, might be more prone to do the one thing, and some the other. Thus there would be a fluctuating and personal element—something, I think, should be allowed for the personality of each individual creature. Of course, if such an explanation would account in any degree for a superfluity of nests, or for uncompleted nests being put to some other purpose in the case of Grebes, it would do so to the same extent in the case of other birds; and here we come to the one or more extra nests—usually called “cock-nests”—built by Wrens, and the conflict of evidence or opinion as to whether these extra ones are or are not put to any special purpose. But it is not only Wrens—or, as we have now seen, Grebes—that abandon the nest they have been building, and build another. Blackbirds—and here it is the hen only that builds, though closely attended on by the male—are liable to do the same; for I watched a building pair most closely this spring, and, when the nest was almost finished, it was abandoned—quite capriciously, as it appeared to me—and another commenced not far from it. For this reason, and from what we know in regard to the Wren, I do not think the destruction of the original nest was the cause of these Grebes building a *third* one as well as a second. I attribute it to unsteadiness, or what I have called wavering of the instinct—not meaning by this to wrap up ignorance in a phrase, but rather to imply that no specially induced cause need be assumed. As nature can thus act in the female, one might expect her to do so more often, and in a greater degree, in the male, when he is also the builder.

Before leaving this subject I will just hint the possibility—for here I can do no more—of abandoned nests being the origin of

the bower or run of the Australian Bower-birds. Had these two Grebes paired or coquetted about the *old* nest whilst they were building the new one, here would have been, in fact, something very like the actual bower; and that a nest might come in time to be regularly made for this special purpose, and then used more generally, and also to be more and more ornamented and modified owing to general or special causes (with regard to which latter I would refer again to my previous remarks), should not seem very astonishing to any evolutionist.

Once let there be pairing on the nest—which I have seen in other instances—and the bower, as it appears to me, is no longer such a mystery.

Of course, I am aware how widely the bower often differs from the nest of the same bird, yet not more widely than does one nest, or even one bower, from another, or than a palace or other elaborate building differs from a savage dwelling, or even from a small house or cottage.

Differences in the site chosen for the nest and bower may offer a difficulty, but, if I mistake not, the principle of evolution has been accepted as overcoming greater difficulties than this. Birds, indeed, exhibit great adaptability in the placing of their nests.

It is true that in standard works of ornithology we are told that the "bowers" have nothing to do with the nests of the species making them, whilst, at the same time, complete ignorance as to their origin and meaning is confessed. If we know nothing about a thing, how do we know that it has nothing to do with some other thing? On the other hand, when we find a vast number of birds making a certain structure—the nest—which is an outcome and effect, with them, of the sexual instinct, and when we find also a few birds making, besides the regular nest, other structures of a more directly sexual character—as to which one has only to read the accounts, or to observe the actions, of the Satin Bower Birds in the Zoological Gardens—the *prima facie* likelihood would seem to be that there is, and not that there is not, a connection between the two instincts.

May 23rd.—First I will say that I forgot to note down yesterday that, after the birds had been building some little while,

the female not only ascended the nest, but lay along it as before, with the same evident intention of receiving the male, and the same non-result.

At 5.30 a.m. I find the birds not working, but floating idly on the water. They are now side by side, each with the long neck drawn back, so that the head rises like a button from the centre of the back, making them look like pork- or game-pies floating about.

6.8.—Both now swimming to the nest, and when just off the bed of weeds where it is situated, first one and then another of them lies on the water, with the beak held down in a somewhat curious manner, as though minutely observing it, for the beaks point in its direction. It is the female who does this first, and I thought she wished to receive the male, for her attitude was just the same as when, upon the nest, she undoubtedly intended this. She soon desists, however, and it is then that the male assumes the same attitude, in which he continues longer.

At 6.30 the male goes again to the nest, and remains about it, but never going quite up to it, for some five or six minutes; then swims again to the female, who has not accompanied him. The interest taken by the male in the nest has been very marked throughout, more so even—in appearance, at any rate—than that of the female, though in the actual building of it she has been yet more efficient than he. He has always led the way to it, and yesterday—as noted—he continued building longer than she did.

6.54.—Male at nest as before, and begins now to dive and add to it. After a minute or two he ascends the nest, and I shall now—as hitherto—record exactly what I saw. After standing a little with straddled legs, he sinks down, and lies along the nest in just the same manner, as far as I can see, as the female has done, once before actual or attempted pairing, and many times, as prepared for and wishing it. The female is now swimming up, and, on arriving at the nest, she acts exactly as the male has done when contemplating ascending it in order to pair with her. Both in action, manner, and strongly implied intent the sexes seem to be reversed, yet there is no

doubt as to which is which, for the male is very considerably larger than the female.

The male rises once or twice, standing upright, and each time lies along again in the same attitude, the female continuing to act as described. Finally, however, the male takes the water, and begins again to fish up and bring weeds to the nest. In a little while the female ascends the nest, and lies along it just as the male has done (and she herself formerly), though perhaps with a greater earnestness and wraptness. Besides the marked difference in size, I should say that, since the descent of the male, I have kept the two birds quite distinct. Nor have they been close together, but wide apart; for the male, as he came down, swam to the bank, and then along it, whilst the female swam out into the middle of the lake. The male now comes up to the nest, where he first acts in the same way as he has done before, and as the female has just done; and then, after a few moments, leaps up, coming down and standing firm and upright on the back of the female some way forward towards the centre of it. Either he now, or the female, or the two birds together—as I think is the case—utter a sharp little note of one syllable, quickly repeated, which I can hear plainly, though faintly. But the attempt to pair is unsuccessful, the male bird being, apparently, unable to move backwards, and soon passing forwards along the back of the female, and so taking the water. Judging from this, and from the first occasion, the pairing of these birds would seem to be a matter of some difficulty. There is no second attempt, but the male begins to preen himself, and the female soon entering the water, both birds swim away.

7.50.—The two birds swim again to the nest, and the female now lies along on the water just off the bed of weeds in precisely the same attitude as on the nest during the pairing. The male bird comes up as though about to pair, then passes by her, returns and passes again, and, at the third time, swims right into the weeds near the bank, where he lies along in the same manner, just as she has been doing, and as he has before done, both on the water (though I did not then catch the import) and on the nest. There is no difference in the action and attitude of the two birds; one seems as strongly indicative as the other. The female now, whilst the male is still acting thus, or immedi-

ately after he has done so, ascends the nest, and lies along it in the usual manner. The male ascends as before, and it would seem that this time the pairing is accomplished. I, however, only judge so by the subsequent behaviour of the two birds, which has that satisfied appearance as of something successfully accomplished, which all who have watched birds will know. The time occupied was extremely short, and one would hardly have thought from the position of the two birds that actual pairing had been possible.

It will thus be seen, that before each of these pairings or attempts to pair, the male Grebe assumed the posture proper to the female on such occasions, and the first time actually went on to the nest in order to do so, that being, it would seem, the chosen spot for the performance of the nuptial rite. Except for this, and to take his share in incubation, I have not seen the male bird (nor, for that matter, the female either) ascend the nest; neither would one expect him to do so, as the birds do not ascend to build or shape it, and also he makes himself a special platform. I therefore attribute his doing so, as also the concomitant actions, to a peculiar, and, as we would call it, perverted sexual activity, in which, moreover, the female shared. I should say that during the last pairing the cries of the birds—for they were evidently uttered by both of them—were louder and more pronounced than before, and also of two kinds. The first and loudest note uttered was sharp and shrill in quality, approaching to a kind of screaming. The other I cannot now distinctly recall.

Now, with regard to the curious apparent change of sex in these two Grebes, I here recall what I have observed in the case of a pair of dovecot Pigeons, *viz.* that, immediately after the ordinary pairing of the birds, the male would crouch to the female, who then performed, apparently, the office of the male; so that anyone seeing the two, and unacquainted with such possibilities, would have sworn absolutely that the female bird was the male, and *vice versâ*. Should this appear incredible to some, I can only say that I saw it take place right in front of me, not once merely, but several times, and at no more than a step or two's distance—in fact, under such circumstances as eliminated the possibility of mal-observation.

Darwin, speaking of domesticated birds, says ('The Descent of Man,' p. 415) "these are often pampered by high feeding, and sometimes have their instincts vitiated to an extreme degree. Of this latter fact I could give sufficient proofs with Pigeons, and especially with Fowls, but they cannot be here related."

Possibly he may refer, amongst others, to such instances as the foregoing; but, if we can thus account for them in the case of Pigeons, what are we to say in regard to a pair of Great Crested Grebes, living a natural life upon a sheet of water as large perhaps as some of the smaller broads or meres? If we say it is vitiated or perverted instinct, still there must be a natural cause for what we regard as the perversion. As is well known, hermaphroditism preceded, in the march of life, the separation of the sexes, and all of the higher vertebrate animals, including man, retain in their organisms the traces of this early state. If the structure has been partly retained, it does not seem unlikely that the feelings connected with it have, through a long succession of generations, been retained also, and that, though more or less latent, they are still more or less liable to become occasionally active. This view would not only explain such actions as I have here recorded, but many others scattered throughout the whole animal kingdom, and might even help to guide us in the wide domain of human ethics.

May 24th.—Same place at 6.15 a.m. The birds are floating together again, like pork-pies on the water, but up till now (7.15) they have not approached the nest. I have then to leave.

May 25th.—Between 3 and 3.50 p.m. the birds are not at the nest, but swimming about near the opposite bank, and I think I notice in them some disposition to build another nest. The male, having swum to some distance from the bank, returns very fast to it with the other Grebe. All at once he dives, and, coming up near the bank, makes a sudden dart, and spears forward with his beak, to the confusion and flight of a Moor-hen. It is now, therefore, evident that one way, at least, of fighting adopted by these birds, is to dive, and either attack under water or just after rising—I say one because, on the first occasion, when I saw the male attack a Moor-hen near the first nest, he did not dive. I now think it probable that the first Moor-hen was attacked because he was near the platform of the male Grebe

(possibly he had been using it), and the second, because he was near a contemplated one.

May 28th.—At about 6.30 this morning the birds were not at the nest, which they seemed to have abandoned, nor were they building another.

This was the last observation I could make on these birds, for I had now to leave for the Shetlands. When I returned in the latter part of July, they were swimming about with two young ones, which, in size at any rate—their appearance was very different—were getting well on towards maturity. On these I made a few notes, which I have now lost. Though I saw much to interest me in the Shetlands, I sometimes think that I should have learnt more if I had stayed and devoted the whole intervening period to these Grebes, that I was able to watch so closely and continuously. In such watching an unbroken sequence is of great importance.

NOTES AND QUERIES.

AVES.

White Wagtails near Southport.—While walking along a bridle-road within about two hundred yards of the shore on the north side of Southport, on April 20th last, I noticed a pair of White Wagtails (*Motacilla alba*) running about. Observing their fearlessness of my approach, I sat down on a sand-hill close by, and watched them feeding only a few feet from me. I noticed that one was a female, having much less black on her head than the other. Suddenly a Pied Wagtail appeared, and drove the white ones farther away. At high-water mark (the tide being out) I noticed, within a distance of two or three hundred yards, more than half a dozen White Wagtails scattered about, and concluded that a migration of them was proceeding along the coast.—G. TOWNSEND (Polefield, Prestwich, near Manchester).

[Several instances have been recorded of interbreeding between the White and Pied Wagtails.—ED.]

The Vibrating Sounds of the Lesser Spotted Woodpecker.—I have been much interested in reading the note by Mr. C. H. New respecting the tapping sound of this species (*Dendrocopus minor*), (*ante*, p. 107). It is fairly common in this district, and I have often wondered how such a mysterious noise could be produced by the bird tapping with its bill on a branch or trunk of a tree. In April of last year I was attracted to an orchard on Milton Hill, Wells, by the sound in question. I located the bird in the branches of an apple-tree, which it left, and flew to an oak in an adjoining field. Here exactly the same sound was produced, but the bird left the tree again as soon as I got within a few yards, and flew to an elm growing in a hedge bordering the roadway, on the other side of which is a plantation known as the Coombe. I went down into the road, and watched the bird several minutes before it flew away; here the same sound was produced as from the apple- and oak-trees. I also noticed that whilst it shifted restlessly about the very small branches at the top of the tree the noise did not vary, resembling somewhat in miniature the sound uttered by the Nightjar, or drawing a stick with great rapidity along iron railings. I am inclined to believe the sound is uttered from the bird's throat, and used as a call- or mating-note during nesting-time. I have never to my

recollection heard it in autumn or winter, the exceptional sound of which has evoked a remark from Mr. New. If the sound was caused by tapping, would it not be heard at all seasons? Again, it can be heard a considerable distance; but, if a tap, would it not be lost at thirty or forty yards?—STANLEY LEWIS (Wells, Somerset).

[Seebohm, on the Petchora, relates a different appreciation of this sound. He writes of the "Three-toed Woodpecker" (*Picoides tridactylus*): "On another occasion we heard the tapping sound of the Woodpecker's beak; a tap, then a slight pause, followed by a rapid succession of taps, and, after a second slight pause, a final tap. I imitated the sound as well as I could with a cartridge on the stock of my gun. The bird immediately flew to a dead larch-trunk close to where we were standing, and perched, its head thrown back, listening, some fifty feet from the ground. In this position it fell to my companion's gun. It was a female" ('The Birds of Siberia,' p. 110).—ED.]

Glossy Ibis in Durham.—An example of the Glossy Ibis (*Plegadis falcinellus*) was shot by a farm-servant at Billingham Bottoms, near Stockton-on-Tees, on the 25th of November last. I am informed by a naturalist friend, who has seen the specimen, that it is "apparently an adult, with the beautiful shot-green reflections on the back; unfortunately the sex was not noted." Of other records in the north-eastern counties, I have three for Yorkshire, and one is mentioned by Hancock in Northumberland, on the river Coquet ('Birds of Northumberland and Durham,' p. 130).—T. H. NELSON (The Cliffe, Redcar).

Early Breeding of Wood-Pigeon and Snipe.—Two instances of early breeding of birds in West Suffolk in an unusually cold and backward season seem worth recording. On April 3rd a fully-fledged young Wood-Pigeon fluttered down from a nest in an ivy-covered tree in our grounds; and on April 16th my son found a clutch of four newly-hatched Snipe. The eggs in this nest must have been laid in March.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

Varieties of the Dunlin (*Tringa alpina*).—The remarks of Mr. Backhouse under the above heading (*ante*, p. 91) caused me to measure carefully the birds in my collection, as well as some kindly lent me by Mr. N. F. Ticehurst. Although these measurements, to a certain extent, bear out Mr. Backhouse's remarks—*viz.* that the short-billed form is rather different in its habits to the large-billed form, and is found in different situations, or, if the same locality, under different conditions of weather, &c.—yet, on the other hand, one can hardly take the view that there should be two distinct species so closely allied, having—for, at all events, a great portion of their range—a similar distribution. As far as one can judge, the

questions of age and sex may be disregarded, as the sexes are the same size, and, once the young are able to fly, their bills and wings appear to reach their normal adult development. As will be seen on reference to the list of measurements, almost all the specimens were obtained in two localities a few miles apart, namely, between Dungeness and Littlestone in Kent, and at Rye Harbour in Sussex. At Littlestone there are no drains, and the shore is merely a flat stretch of sand and shingle; while at Rye there is a large extent of shore, a river with high banks uncovered at low water, and a small salting intersected by drains. Of the ten birds from Littlestone, only one is of the small form; and of twelve specimens from Rye, half of them belong to the short-billed race—a result which certainly tends to confirm Mr. Backhouse's remarks. It is unfortunately not noted which of the Rye birds were shot on the shore, and which in the drains, or possibly the results might be of a still more confirmatory character. Of two birds, however, shot on the fjeld near Vadsö, in Norwegian Lapland, one belongs to the large race and one to the small, and these birds were at that time breeding near the same place, and in a precisely similar situation, *viz.* a wet swamp on the fjeld some two miles from the coast. Mr. Barrington, in his recent work on the Migration of Irish Birds, gives the measurements of the wings of twenty-four examples, showing all variations from 4·87 in. to 3·95 in., neither form preponderating at any particular station. If these forms were in reality distinct races, we should expect to find either (1) that there was a distinct break in the continuity of the measurements, or (2) that their geographical distribution was different—at any rate, during some period of the year. But, as neither of these tests is borne out by the facts, and wherever the species is found both forms occur in fairly equal numbers, they can only be considered as the extremes of a very variable species. It is at the same time interesting to note that the difference in length of the bill is to a certain extent correlated with different habits, and, if one may be permitted to theorise, it seems probable that in this case the bill has influenced the habits, and not *vice versâ*, as is generally the case.

LARGE FORM.

			Bill.	Wing.
Dungeness	♂	adult, September ...	1·46 in.	4·75 in.
"	♂	young, "	1·22	4·86
"	♂	" "	1·24	4·75
"	♂	" "	1·26	4·74
"	♂	" "	1·26	4·51
"	♀	" "	1·47	4·75
"	♀	" "	1·26	4·5
"	♀	" "	1·22	4·52
"	♀	" "	1·18	4·51 (doubtful)
Rye Harbour	♂	" "	1·34	4·75
"	♂	" January	1·24	4·7
"	♂	" "	1·35	4·75

		Bill.	Wing.
Rye Harbour.....	♂ young, September...	1·37	4·75
"	♀ " " ...	1·23	4·7
"	♀ " " ...	1·28	4·25
Boston, Lincolnshire..	adult, October.....	1·27	4·37
Vadsö, Norway.....	♀ " June	1·31	4·63

SMALL FORM.

Dungeness	♀ young, September...	1·2	4·25
"	♀ " " ...	1·13	4·5
Rye Harbour.....	♂ adult, " ...	1·1	4·5
"	♂ " August	1·1	4·15
"	♂ young, September...	1·18	4·5
"	♂ " " ...	·98	4·5
"	♀ adult, August	1·12	4·25
"	♀ young, September...	1·09	4·36
Boston, Lincolnshire..	October	1·14	4·5
"	♂ " " ...	1·12	4·0
Hunstanton, Norfolk..	♂ young, "	1·16	4·5
Vadsö, Norway.....	♂ adult, June	1·12	4·0

J. L. BONHOTE (Ditton Hall, Cambridge).

Varieties of the Dunlin.—Seventeen or eighteen years ago the late Mr. Blackett Greenwell, of Alston, gave me the skin of a very small Dunlin, and told me that it was one of the Crossfell race, which I am sufficiently familiar with in life, though I never shot a breeding Dunlin on the fells. I have seen many hundreds of Dunlins on the Solway Firth in the breeding season, and with a good glass examined them at their nests as closely as if I had held them in my hand, but I never met with a bright-coloured Dunlin on the marshes of the Solway Firth. The Solway Firth birds lack the broad dorsal margins of chesnut which exist in the typical "fell" Dunlin, and which are likewise characteristic of the large Dunlin, which Dr. R. B. Sharpe has separated as *Pelidna americana* (Cat. Birds, vol. xxiv. p. 608). I think that the breeding Dunlins of the Solway Firth would average rather larger than the fell Dunlin. They have longer bills than my Crossfell bird, which is the typical bright-coloured "drain Dunlin" of some east-coast ornithologists. The Dunlins which swarm on the Solway Firth in the latter part of August and September are principally birds of the larger British race, possessed of far shorter bills than the typical American Dunlin, but easily distinguished from our small breeding Dunlins. I can match the Dunlin, which Mr. Greenwell considered to be the typical fell-side Dunlin, with two east-coast birds—one, a male obtained at Great Yarmouth on May 12th, 1875; and the other, a female procured at Greatham on May 28th, 1866. These three agree in having very short bills, and in having the feathers of the upper parts broadly fringed with chesnut, a feature which is *not* characteristic of the marsh-loving Dunlins of the Solway Firth. Though at one time I had occasion to shoot a good many Dunlins,

I never, so far as I can recollect, shot a Dunlin in the breeding season ; I therefore, cannot say, that the larger race of Dunlin may not occur with us in nuptial dress ; but I have known for many years that the fell-side Dunlins were our smallest and brightest coloured birds, while the birds of the marshes are rather larger, and lack the bright colour of the Dunlins of the fells, being probably intermediate between the birds of our mountainous areas and the larger Dunlin which comes to this country in tens of thousands as an autumn and winter visitor. But as to the smallest race of Dunlin being separated as a valid species, I should certainly vote against any such decision. It would be quite as easy to make several species of the common Goldfinch as of the European Dunlin. There is the greatest difference in size and plumage between the smallest race of Goldfinch found in the Mediterranean sub-region and the very large Goldfinches which are procured in some parts of Russia. But so many intermediate specimens can be found that bridge over the differences between the extreme types, that it is much more satisfactory to recognize the various races as being merely local variations from the original type.—H. A. MACPHERSON (Pitlochry, N.B.).

Black Tern in Cheshire.—On June 4th last year, when at Budworth Mere, with Mr. P. G. Ralfe, we saw three birds of this species (*Hydrochelidon nigra*) in breeding plumage. They were very tame, and we had a good opportunity of watching them ; they were evidently feeding, as they were beating up the mere against the wind, and from time to time, after a slight check in their flight, would dash on to the water, and again resume their search. They often settled for a short time on the uprights of an old fence which ran into the water.—FRANK S. GRAVES (Alderley Edge).

Black Tern in Cornwall.—A flock of Black Terns (*Hydrochelidon nigra*) has for some days frequented the Marazion Marsh, which is a considerable stretch of marsh-lands containing one large pool and several smaller ones, about two and a half miles from Penzance. I first observed a pair on Friday, April 19th, and, on visiting the spot on the next day with my brother, Mr. P. G. Harvey, we found from twenty-five to thirty hawking over the " main " marsh. By the aid of a field-glass we made out that they were in an advanced state of plumage, most of them being in practically full summer dress. They are most active about 5 p.m., when they regularly quarter the marsh in their search for food, which they snatch from the surface of the water, uttering their shrill cry incessantly, and forming such a sight as to attract the attention of the most unobservant. They rest in the middle of the day on any convenient bank surrounded by water, and in the evening, about 7 p.m., they bathe before settling down for the night. I have never seen or heard of this bird in West Cornwall for many years,

though probably some are to be seen in the fall of the year. — ARTHUR W. HEXT HARVEY (Penzance).

Notes from Shetland. — On March 26th I caught a Song-Thrush (*Turdus musicus*) in the garden. This is the second one, only, I have seen since coming here in October, 1898. The first one was brought to me alive on Nov. 15th, 1898, and was immediately set at liberty. During the winter six Short-eared Owls (*Asio accipitrinus*) have resided in the plantation, and it has often amused me to see three or four of them at a time flushed and mobbed by numbers of Hooded Crows, the Owls not seeming to mind much, and quite able to hold their own. On Jan. 11th last I picked up from among some shrubs a mangled specimen of a Long-eared Owl (*Asio otus*). There was a large wound on the back of the neck and head, probably inflicted by a large Hawk. A White-tailed Eagle (*Haliaëtus albicilla*) has been frequently seen during the winter. On March 4th a large flock of Rooks (*Corvus frugilegus*) arrived here. April 11th was the date of their arrival last year. Though I am informed that the Rook breeds in the neighbouring islands of Orkney, I am unable to ascertain that it has ever done so in Shetland, though numbers remained here during last summer.—T. EDMONDSTON SAXBY (Halligarth, Unst, Shetland).

Some March Notes from Aberdeen.—The first appearance here of the Curlew (*Numenius arquata*) was on March 3rd, and on the same date I heard the spring notes of the Golden Plover (*Charadrius pluvialis*). I also heard a Bleater-Snipe (*Gallinago caelestis*) bleating in the manner peculiar to these birds on March 6th. The Pied Wagtail (*Motacilla lugubris*) made its appearance at the same time. The Common or Green-billed Gull (*Larus canus*) came inland on the 11th, while a flock of Wild Geese crossed over here on the 20th of the month. A specimen of the Common Redshank (*Totanus calidris*) appeared on the 22nd. This bird only visits here by turns, and it is doubtful whether it breeds in the neighbourhood, though I believe that a pair have occasionally done so; but they only appear occasionally in this immediate locality. A prominent observation of the month has been the severe privations of birds caused by the very cold and stormy weather. I noticed a heavy death-rate among Lapwings (*Vanellus vulgaris*), which fall easy victims to severe weather at this season of the year. In fact, these birds seem very deficient in caution, as any genial weather leads them inland to their proposed summer haunts, and when a snowstorm, such as we have recently experienced occurs, they are reduced to extreme privations, and many succumb. There has been a heavy death-rate here; the remains of the unfortunate birds are numerous, generally near fresh water, where they had congregated in want of food and shelter. They constitute a forcible example of a species of birds which, although now

protected during the nesting season, and should thus increase in number, still receive at times such a check from severe weather as considerably diminishes their ranks.—W. WILSON (Alford, Aberdeen, N.B.).

ANIMAL INTELLIGENCE.

IN this magazine (1897, p. 29) I ventured to repeat the statement made to me in the Transvaal, that the Chacma Baboon can count up to three, but not higher. I have just read in the recently published Seebohm's 'Birds of Siberia,' in connection with the Grey Plover (p. 154):—"Our* little manoeuvre of walking away from the nest in a body, leaving one behind lying flat on the ground to watch, under the impression that the bird could not count beyond three, and would think that we had all gone, was clearly so much artifice wasted." The two impressions are so very similar that it would be not only interesting, but important, if any of our contributors could add further suggestion or information on the question.

With all our increasing bionomical information, we know practically little as to the intelligence of animals other than ourselves. We teach them to obey, and in some cases make them understand what we want them to do, but never seek to put ourselves in real communication with them. Recently much has been said and written as to our opening communications with the inhabitants (?) of Mars. Would it not be more feasible to try and communicate with the animal life of this planet? Language is not necessarily articulate, and it has been proved that the gesture language, when acquired by deaf and dumb mutes, is understood by other primitive races. We know that animals do communicate with each other. How do they do it, and how may we participate in the process?—W. L. DISTANT.

* Mr. J. A. Harvie-Brown was the comrade of Seebohm in this expedition,

NOTICES OF NEW BOOKS.

American Hydroids. Part I. The Plumularidæ. By CHARLES CLEVELAND NUTTING. Washington: Government Printing Office.

THIS is the first part of a folio publication devoted to these lowly but most interesting forms of animal life. It appears that the great concourse of Plumularian life in American waters was almost unknown to the earlier workers who studied the group. In 1862 the elder Agassiz, in his 'Contributions to the Natural History of the United States,' included only three species of *Plumularidæ*; three years later his son, Alexander Agassiz, recognized six species; Prof. Allman, in studying the material secured by Pourtalès in the Gulf Stream, enumerated or described no fewer than twenty-six species; and, irrespective of the contributions of other workers, "at the time of the inception of the present work, it is doubtful if more than fifty species of *Plumularidæ* were known to occur in American waters." Prof. Nutting gives descriptions and figures of some one hundred and twenty-one species, and remarks:—"It is now evident that the West Indian region is the richest in Plumularian life of any area of equal size in the world. Not even the Australian region, hitherto regarded as by far the most prolific in these exceedingly graceful organisms, can equal our own southern waters in profusion of genera and species." From a study of all the data obtainable, Prof. Nutting inclines to the conclusion that Plumularian life increases in species down to a depth of 500 fathoms. Below that depth the data are insufficient to warrant any deductions. This publication is embellished with thirty-four excellent plates, and again attests the excellent and exhaustive manner in which zoology is fostered in the United States of America.

Zoological Results based on Material from New Britain, New Guinea, Loyalty Islands, and elsewhere. Collected during the years 1895-97. By ARTHUR WILLEY, D.Sc., Lond., &c. Parts III., IV., and V. Cambridge: at the University Press.

PARTS I. and II. of this truly biological publication were noticed in 'The Zoologist' for 1899 (p. 90). Since that time three more parts have appeared, and have maintained the standard which the authors of the first instalments so well initiated. It is difficult indeed to adequately draw attention to Parts III., IV., and V. The authors are many, the subjects numerous, and, we may add, relate to animals unfortunately *caviare* to most of our readers. Thus the *Enteropneusta*, described by Dr. Willey, represent a group scarcely recognized by many zoologists of other special studies, and their position in animal life understood by still fewer; and yet inspire a communication that really makes for a knowledge of organic evolution. Evolution to-day is the talk of the man in the street; though its principles are understood by so few, that it is practically—so far as technical knowledge is concerned—confined to the consideration of experts. The most popular doctrines are generally those least understood outside the circle of serious students. In Part IV. ornithologists will find "A contribution towards our knowledge of the pterylography of the *Megapodii*," by Mr. Pycraft; while the Robber Crab (*Birgus latro*), too often considered as having its young born resembling the parent, is well described and illustrated in Part V. by Mr. Borradaile as producing its young in the zoëa stage. These short notices give no proper digest of the contents of these last published parts; but, for the reasons given above, further review is beyond our space. It is a work for consultation rather than for quotation, and it is a sign of the times that several of the contributors are ladies.

First on the Antarctic Continent, being an Account of the British Antarctic Expedition, 1898-1900. By C. E. BORCHGREVINK, F.R.G.S. George Newnes, Limited.

A KNOWLEDGE of the Antarctic regions is as much desired by zoologists as by geographers. Many problems in zoo-geography

were considered as of probable solution when the fauna of these frigid wastes was studied, and we are indebted to the generous enterprise of a private citizen, Sir George Newnes, that this expedition was made possible. It was accompanied by Nikolai Hanson, an accomplished zoological collector, who had already done good work for both the British and Christiania Museums, but who unfortunately succumbed to disease, and was buried on this lone continent.

The zoological results which will interest most of our readers are to be found in Chapter VII.—“Among the Penguins”—*Eudyptes adeliae* being the dominant species; and the question was solved as to the black-throated and white-throated Penguins being one species at different stages of plumage. The worst enemy of these Penguins is a Skua (*Lestris*), “which constantly soared over their nests, watching for an opportunity when they might steal an egg or catch a young one.” The author claims, by the discovery of species of insects and members of the shallow-water fauna, to have further proved the existence of bipolarity, and we may expect to hear more of this expedition when the whole of the biological collections have been worked out.

Text-Book of Zoology, treated from a Biological Standpoint. By Dr. OTTO SCHMEIL. Translated from the German by RUDOLPH ROSENSTOCK, M.A.; edited by J. T. CUNNINGHAM, M.A. Part II. Birds, Reptiles, Fishes. Part III. Invertebrates. Adam & Charles Black.

LAST YEAR a notice of Part I. of this publication appeared in our pages; we have now received Parts II. and III., completing the work. We then appraised this ‘Text-Book’ as supplying a want in introductory Zoology to school children, to whom zoology is not an end, but a part of a liberal education. We still hold that opinion despite many lacunæ, and a general absence of progressive nomenclature and classification. But to impart that information is not the aim of the publication; it is rather designed to describe an animal as it is, more than its evolutionary position in the organic series, or under its more modern cognomen in advanced scientific literature. It is suggestive

rather than profound, and perhaps that is a merit when we consider the hands into which it is likely to fall. Of faulty treatment, we may instance the section devoted to the Crocodilia as an example. We have no distribution of the Crocodiles described, and as the only species referred to is *C. niloticus*, a youthful enquirer might consider that the Crocodiles were confined to Africa. Moreover, the Garial and the Alligator are given as "Allied Species," when it would clearly have been more exact to write allied genera. But the book still fulfils a purpose of its own, and we know of no other that will make a child think more of the animals described; while, if the teacher is really capable of his or her implied function, some healthy commentation may be made, and some likely misconceptions be avoided.

The Fauna of British India, including Ceylon and Burma.

Edited by W. T. BLANFORD. Arachnida, by R. I. Pocock.

Taylor & Francis.

SINCE the publication a few years previously of Thorell's 'Spiders of Burma,' this is the most important work on the Eastern Arachnida that has appeared, and it altogether supplements Thorell's 'Monograph' by treating the Arachnida as a whole, including the *Scorpiones* (Scorpions), the *Uropygi*, and the interesting *Solifugæ*. Altogether three hundred and forty-three species are fully described—the *Araneæ*, probably owing to the exigencies of space, having a shorter diagnosis than the preceding orders—and the families and genera clearly characterized. The illustrations are not so numerous as in some other volumes of the series, but those given are apt, and of a structural description. The volume is a distinct addition to our knowledge of Indian zoology, and forms a worthy contribution to an excellent and much needed faunistic monograph relating to the Oriental Region.

EDITORIAL GLEANINGS.

MR. W. L. SCLATER, the Director of the South African Museum, has contributed an article to the January number of the 'The Educational News' of Cape Town on the "Migration of Birds in South Africa." Mr. Sclater estimates that there are about forty-four birds which migrate from Europe to South Africa.

Passerine Birds.—Golden Oriole, Spotted Flycatcher, Lesser Grey Shrike, Whitethroat, Garden-Warbler, Willow-Wren, Icterine Warbler, Marsh, Great Reed, and Sedge Warblers, Martin, Sand-Martin, Swallow, Yellow Wagtail, Tree-Pipit.

Picarian Birds.—Alpine Swift, Common Swift, Nightjar, Roller, Bee-Eater, and Cuckoo.

Game Bird.—Quail.

Shore Birds and Waders.—Pratincole, Caspian Plover, Ringed Plover, Kentish Plover, Green Plover, Turnstone, Avocet, Stilt, Great Snipe, Sanderling, Little Stint, Curlew-Sandpiper, Knot, Ruff, Common Wood and Green Sandpipers, Redshanks, Greenshanks, Curlew, and Whimbrel.

All these birds are summer visitors, only arriving in September and October, and leaving again in April. In most cases, at any rate, they do not breed in South Africa, although this season is the breeding one for other resident birds; but this is a special point which requires investigation.

One of the best known of these birds is the English Swallow, which must be carefully distinguished from the many other South African Swallows, many of which are resident and breed in South Africa. It may be known by its red forehead and throat, black-blue upper surface and chest-band, and buff-white abdomen. It is found everywhere in South Africa, from Cape Town to the Zambesi, from November to March; but when it arrives, after a journey of over six thousand miles, its plumage is much bleached, the throat is nearly white, and the chest-band pale brown. However, before leaving again for the north, it undergoes a complete spring moult, and sets off on its long journey in a complete new set of feathers.

In Natal Mr. Seebohm has observed that the Swallows remain till the first week in April, while other observers state that they arrive in North Africa during the last half of February, in South Europe during the first

half of March, and in Central Europe not until the last half of March. It is perfectly certain that the Natal Swallows, if they only leave during the first half of April, even allowing only a few days in which to accomplish a journey of five thousand to six thousand miles, must go to some part of North Europe or to North-west Asia, since the Swallows which breed further south have arrived at their breeding-grounds before the South African birds have left their winter quarters. So far as it goes, this evidence is conclusive that, in case of the European Swallow, the individuals which go further north to breed go further south in winter.

It has been asserted that some European Swallows remain in South Africa through the greater part of the year, and Andersson even asserts that in some uncivilized parts they affix their nests to some projection of a rock or trunk of a tree. More evidence, however, on this point is required.

Between August and April there can generally be seen about Cape Town and the suburbs large numbers of Black Swifts, flying often at a considerable height above the ground, as is their usual habit. Mr. Layard believed these to be the European Swift, which spends the summer months in Europe, and disappears southwards in August or September. A careful comparison, however, of the European and South African bird seems to show that there are differences between them, the African bird being somewhat larger and darker in colour. Hitherto no authenticated observation on the breeding of the Black Swift in South Africa has been made; but if, as is now supposed to be the case, the South African bird is distinct, it probably does nest somewhere in South Africa, and at any rate the birds from about Cape Town do disappear during the winter months. We do not know where they go to.

Besides the migrants from Europe who come to South Africa to avoid the northern winter, there are a good many birds whose breeding range is in South Africa, and who migrate northwards during the South African winter, probably to Central Africa; about the exact migration range of these birds much less is known than about the movements of the European birds.

Among the more familiar or better known cases are those of the White-throated Swallow, which remains only from August to March; the Pearl-breasted Swallow; the large Stripe-breasted Swallow, one of the most familiar of the group, which generally builds its nest—a retort-shaped chamber entirely constructed of mud pellets—over a porch under the shelter of a verandah. Among other groups are the Carmine-breasted Bee-Eater, only found in north of the Vaal River, and the solitary Cuckoo, commonly known as the “Piet Mija Vrouw.”

All these birds are found in South Africa during the South African

summer from September to March, after which date they are seen no longer, but are supposed to retreat northwards, to somewhere in Central Africa, for the southern winter.

WE are glad to see that Mr. Herbert Goss has published a second edition, revised, of his 'Geological Antiquity of Insects.' Mr. Goss is thus doing in Britain a similar work to Scudder in America, and entomology, like other branches of zoology, is falling into line in the rejection of the idea that animal life is, or can be, only studied under present appearances. Zittel's 'Grundzüge der Palaeontologie,' which can now be consulted in an English translation, has the Insecta instalment naturally abridged. Mr. Goss has provided a much fuller essay on the subject, which is published at a small cost by Gurney and Jackson. Twenty years have elapsed between the appearance of these two editions, and the author, having put his hand to the plough, should not draw back, but give us a still fuller and more comprehensive work on the subject which he seems to have really made his own in this country.

ON the Wheatears (*Saxicola*) occurring in North America—this question is discussed by Leonhard Stejneger in the 'Proceedings' of the United States National Museum (vol. xxiii. pp. 473–81). The common European Wheatear (*Saxicola œnanthe*) is a regular breeder in the United States, and Mr. Stejneger, following Degland (1849), Baird (1864), Gould ('Birds of Great Britain'), and more especially Lord Clifton ('Ibis,' 1879), not only recognizes two forms—a larger and smaller—both in Europe and America, but also applies a distinctive name, *Saxicola œnanthe leucorhoa*, Gmel., to the larger form of the species, which he thus diagnoses:—"Larger than *Saxicola œnanthe*, the length of wing varying between 100 and 108 millimetres; colour similar, but the rufous tints more bright on the average."

THE artificial incubation of Alligator eggs is described by Albert M. Reese in the March number of 'The American Naturalist' (p. 193). The Florida Alligator lays her eggs, about thirty in number, in a so-called nest, which she constructs of sticks, leaves, earth, &c., on the banks of the pond or stream in which she lives. The eggs are laid in the cavity of the nest, and are carefully covered, and allowed to incubate by the heat of the sun. When the young Alligators are about ready to hatch they make a curious squeaking noise, which attracts the mother's attention, and she uncovers the eggs so that the young Alligators may not be smothered in the nest after they escape from the eggs. This fact was confirmed by the artificial hatching of a few eggs in an incubator at a temperature of 37° C. On

opening the incubator a couple of weeks after the insertion of some well-developed eggs "curious squeaking sounds were heard coming from the inside of the eggs, the sounds which in nature tell the mother that her young are about ready to hatch, and should be helped out of the mass of earth and leaves in which they are buried. These sounds are audible at a distance of fifteen yards or more, so that even when the eggs are buried in the nest the parent is probably able to hear the call of her young. The next day after the first sound was heard, one of the Alligators broke out of its shell, and a couple of days later two more hatched.

WE have received a Report on the Sarawak Museum, written by Mr. R. Shelford, the Curator, dated February, 1901. Apart from the details of the very satisfactory progress in the growth of this happily situated institution, the most interesting biological information relates to the seasonal variation in the Rhopalocera. Mr. Shelford writes:—

"It is noteworthy that Bornean butterflies do not, to any great extent, exhibit seasonal variation; such species that do are quite irregular in their appearance, *e.g.* the collection contains a long series of the so-called wet- and dry-season forms of *Melanitis ismene* (Cr.) which have been caught at all months of the year, and many examples of both forms have been caught in the same month. *Neopithecops gaura* (Butl.) is equally erratic in variability. It appears probable that the markings and colouration of the imago of these variable forms are dependent on the degree of damp or dryness to which the young stages (egg, larva, or pupa) are subjected; if this is indeed the case, a spell of wet weather in the fine monsoon—a by no means unusual event—would produce a crop of wet-season forms, and conversely a spell of fine weather in the wet monsoon a crop of dry-season forms."

MR. LIONEL DE NICÉVILLE, who has recently been appointed "Entomologist" to the Indian Museum, Calcutta, has recently published a most valuable paper on "The Food-Plants of the Butterflies of the Kanara District of the Bombay Presidency" (Journ. Asiat. Soc. Bengal, vol. lxi. pp. 187-278). Apart from food-plants, the larvæ of many butterflies will, when they cannot obtain vegetable food, eat each other, or soft newly-formed pupæ. The *Lycanidæ* appear to have the distinction in cannibalistic propensities. One larva of *Tajura cippus* has been known to eat up over a dozen young ones of its own species. The tendency to cannibalism is not confined to the *Lycanidæ*, but exists also among the *Pierinæ*; the larvæ of *Appias* will eat each other, and any other species of larvæ feeding on the same food-plant as themselves, if forced to it by hunger.

IN the 'Transactions' of the Hull Scientific and Field Naturalists' Club for the year 1900 (vol. i. No. 111) the Secretary, Mr. T. Sheppard, has commenced a series of articles on "Bygone Hull Naturalists," in which the late George Norman (1823-1882) is the subject of the first memoir. Mr. Norman was an old and valued contributor to 'The Zoologist,' contributing no fewer than forty-seven notes between the years 1843 and 1864. An excellent portrait of Norman is given, and memoirs are promised of other Hull naturalists, including Adrian Hardy Haworth, Peter William Watson, Robert Harrison, and William Spence.

THE Transactions and Annual Report of the Sheffield Microscopical Society (1899-1900) contain an abstract of a lecture delivered by Dr. H. C. Sorby, on "Improved Methods of Preparing and Preserving Specimens of Marine Animals." The use of glycerine was recommended.

"He found that, in thus treating a species of *Nereis* worm very common in some of the Essex estuaries, it was possible to dry small specimens and mount them in balsam without any of the minute blood-vessels being obliterated by decomposition. After trying many modifications of this process, the best results were obtained from the following method:—Specimens of the worm, about two or three inches long, were put direct from the sea-water into strong glycerine diluted with an equal volume of water. Here they quickly died, and, after remaining in it for about ten minutes, were seen to be much reduced in size by the transfusion of water into the glycerine. They were then transferred to water, and kept in it for about ten minutes so as to remove most of the glycerine, and to cause them to expand to about their original size. They were then quite limp, and could easily be arranged on microscopic-slide glasses, and were dried as quickly as they could at the usual temperature in the open air, and in doing so became thin, but shrank very little laterally. They were then mounted in balsam, under thin covers, in cells made of thin glass strips. When thus mounted they are not only permanently preserved, but, being made comparatively thin, flat, and transparent, the structure is seen far better than when the animals are alive or recently dead, and the natural red colour of the blood is preserved. When worms are preserved in alcohol or formalin they are rendered opaque, and the blood becomes brown."

In preparing marine animals as museum specimens, Dr. Sorby had had some beautiful results through using strong glycerine. The beautiful natural colours had been, he hoped, permanently preserved. Specimens of Sea-anemones and Star-fish thus preserved were shown, the natural shape of the animals and their delicate tints of colour being much admired.

MR. J. C. STEVENS sold, on April 15th, the library of natural history books formed by the late Mr. Philip Crowley, of Waddon House, Croydon. The following were the highest prices reached:—‘Transactions’ of the Entomological Society, 46 vols. and 4 parts, £38. ‘Catalogue of the Birds in the British Museum,’ 27 vols., £48. ‘The Ibis,’ 1859–1900, £75. ‘Proceedings’ of the Zoological Society, 1830–1900, £60. Lord Lilford’s ‘Birds of the British Islands,’ 7 vols., £63. ‘Biologia Centrali-Americana,’ 35 vols., £90. ‘Great Auks’ Eggs,’ 66 plates, £13 4s. Dresser’s ‘Birds of Europe,’ 9 vols., £56. Grandidier’s ‘Histoire Physique de Madagascar,’ 1875–95, £35 14s. Sander’s ‘Reichenbachia’: Orchids, both series, £14. Gould’s ‘Birds of Asia,’ £51; ‘Birds of New Guinea,’ £45; ‘Mammals of Australia,’ £29 8s.; ‘Birds of Great Britain,’ £49 7s. D. G. Elliot’s ‘Monograph of the Cats,’ £10; ‘Monograph of the Pheasants,’ £53 11s. E. T. Booth’s ‘Rough Notes on Birds,’ £25 4s. G. R. Gray’s ‘Genera of Birds,’ £17 17s.—*Athenæum*.

MR. G. W. KIRKALDY, in the last number of the ‘Journal’ of the Quekett Microscopical Club (April, 1901), contributes a paper on “The Stridulating Organs of Waterbugs (Rhynchotha), especially of *Corixidæ*.” The *Nepidæ*, *Notonectidæ*, and *Naucoridæ* are very briefly dismissed, as no stridulating organs have yet been discovered in these families, the limæ figured by Swinton some years ago being imaginary. In the *Corixidæ* the anterior tarsi are highly modified, being thickened and dilated—more or less knife- or spoon-shaped—in both sexes. In all the species of *Corixa*, there are in the male sex a number of chitinous “pegs” or “teeth” on the inner surface of the flattened tarsi. It was formerly supposed that the stridulation was occasioned by the rubbing of these pegs across the strongly keeled face of the bug. Kirkaldy points out, however, that the pegs exist only in the males, that the peculiar form of face is common to both sexes, and that it is protected by strong bristly hairs, and considers that stridulation is actually caused by the drawing of the pegs on the left (anterior) tarsus across a specially modified area (furnished with minute closely set chitinous points) on the inner side of the opposite femur, or *vice versâ*. These pegs do not exist in the closely allied genera *Micronecta* and *Cymatia*—being replaced by slender bristles—nor is there a specially modified femoral area; and Handlirsch, in a recent paper on the same subject, suggests that the long curved claw of the male in these genera may form part of the musical instrument. The remarkable “strigil” is supposed by Handlirsch to be a stridulating organ, though the present author is sceptical, pointing out that the “musical notes” have only been heard while the bugs are under water, when the abdomen is completely covered by the closely adpressed elytra and wings. It is thought possible that the strigil may be employed while the bugs are on the wing, migrating for mating purposes.

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MIGRATION OF BIRDS IN N.E. LINCOLNSHIRE DURING THE AUTUMN OF 1900.

BY G. H. CATON HAIGH.

THE chief feature of the last autumn passage was the almost total absence of visible migration—indeed, the scarcity of the smaller land birds was quite unprecedented in my experience. The number of shore birds also was far below the average.

The prevailing winds were from the W. and N.W., and the weather on the whole was unsettled and showery. The only movement which amounted to a “rush” occurred in mid-October, lasting from the 13th to the 20th, and consisted almost exclusively of our common winter visitants, most of which were present in their usual numbers.

No rare birds were met with in the district, but among the scarcer visitors may be mentioned the Bittern, Red-necked Phalarope, Wood-Sandpiper, and Little Auk.

The list of absentees is more noteworthy, comprising the Stonechat, Kingfisher, Great Titmouse, Goldfinch, Short-eared Owl, Buzzard, and Wood-Pigeon. I have never previously known the Kingfisher to be absent from the coast during the autumn migration, and the same remark applies to the Short-eared Owl. The Wood-Pigeon was omitted from my last year's notes, but a considerable immigration took place after they were written, about the middle of January. This year my keeper,

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writing at the end of February, said that he did not believe that any Pigeons had come in, as at that time they were not more numerous than in summer.

Turdus viscivorus, Linn. Mistle-Thrush.—These Thrushes were assembled in large flocks by the early part of July, and remained in great abundance throughout the autumn. On Oct. 13th I noticed a considerable number in the coast hedges.

T. musicus, Linn. Song-Thrush.—The passage of this species commenced late. A few appeared in hedges near the coast on Oct. 13th; they were fairly numerous on 17th, and the migration continued until the end of the month. A few appeared again on Nov. 12th, with Redwings and Blackbirds.

T. iliacus, Linn. Redwing.—A few Redwings passed over Grainsby on the morning of Sept. 27th. The principal immigration, however, took place on Oct. 17th and 18th, when these birds were very abundant in the vicinity of the coast, and along the sea-bank, with Song-Thrushes, Ring-Ouzels, and Greenfinches. A few again appeared on the coast on Nov. 12th, and from this date to the end of the month Redwings swarmed in all suitable coverts at roosting-time.

T. pilaris, Linn. Fieldfare.—I did not notice the Fieldfare on the coast at all. A few appeared in Grainsby Park on the morning of Oct. 22nd, and on the 26th I saw a small flock in Waith fen. On the mornings of Nov. 5th and 18th I observed small flocks of Fieldfares passing to S. over Grainsby. None, however, remained in the district, and the species was entirely absent when I left Lincolnshire at the end of the month.

T. merula, Linn. Blackbird.—The passage of this species, though not so heavy as that of 1899, was more extended, lasting for nearly two months. The first flight, on Sept. 26th, consisted almost entirely of young cocks. On the following day very few Blackbirds remained on the coast, but among these were a few old cocks. On Oct. 29th another large immigration took place, consisting of adult birds of both sexes, a great majority being cocks. On Nov. 8th large numbers again appeared in the coast hedges; these were mostly old males, with a few hens and scarcely any young birds. On 12th they were not quite so abundant as on 8th, about two-thirds being old cocks, the rest

old hens and a very few young cocks. Blackbirds were much scarcer on the coast on Nov. 15th, almost all being adults, and cocks largely in excess of hens. By Nov. 20th the passage was practically over, scarcely a bird remaining in the coast hedges.

T. torquatus, Linn. Ring-Ouzel.—A single bird appeared in a hedge near the coast at North Cotes on Oct. 13th. On 25th one was seen in Grainsby Park, and a second found dead. On 28th two were seen near the same place, and one remained until the 31st.

Saxicola oenanthe (Linn.). Wheatear. — A few Wheatears appeared along the sea-bank on July 16th, an unusually early date. I saw no more until Aug. 10th, when a good many arrived, frequenting both the sea-coast and pea-fields adjoining. The passage was over by the middle of September, but I saw single birds on Sept. 19th and Oct. 1st.

Pratincola rubetra (Linn.). Whinchat.—A few in turnip-fields at North Cotes on Sept. 19th.

Ruticilla phœnicurus (Linn.). Redstart. — There was no visible migration of this species, the only indication of it being the appearance, on Sept. 19th, of a single individual in a hedge near the coast at North Cotes.

Erithacus rubecula (Linn.). Robin.—Scarcely any migration. A few came in with Blackbirds and a single Goldcrest on Sept. 26th, and again a few took part in the mid-October "rush" on 17th and 18th of that month.

Sylvia cinerea (Bechst.). Whitethroat.—Many appeared in hedges near the sea-bank on the unusually early date of Aug. 8th, but only one or two remained on 10th. A few came in again with Pied Flycatchers on Sept. 7th. I saw three or four on 19th, and one or two on 20th.

S. curruca (Linn.). Lesser Whitethroat.—I shot a single bird of this species from a hedge near the sea-bank at Marsh-Chapel on Oct. 17th.

Regulus cristatus, R. L. Koch. Goldcrest. — This usually abundant migrant was almost entirely absent. I shot one at North Cotes on Sept. 26th, and saw a couple on Oct. 20th, all in hedges near the coast.

Phylloscopus trochilus (Linn.). Willow-Wren.—One Willow-

Wren with Whitethroats on Aug. 8th at North Cotes, and a second near the same spot on Sept. 19th.

Acrocephalus phragmitis (Bechst.). Sedge-Warbler.—A single bird in a hedge near the sea-bank on Aug. 8th, undoubtedly an immigrant. Last seen Sept. 22nd.

Accentor modularis (Linn.). Hedge-Sparrow.—An insignificant migration as compared with that of the two previous years. It took part in the mid-October "rush," and was fairly numerous in the coast hedges on Oct. 17th, with Redwings, Thrushes, Robins, &c.

Parus cæruleus, Linn. Blue Titmouse.—The first Blue Titmouse appeared near the coast on Sept. 20th. It next appeared in small numbers on Oct. 18th and 20th, and was numerous on 29th. The migration lasted until Nov. 20th, when a few were to be seen in most of the seaside hedges.

Troglodytes parvulus, Koch. Wren.—I noticed a single bird in a hedge near the sea-bank on Oct. 13th, and on the 17th a few were present in almost every hedge near the coast.

Motacilla lugubris, Temm. Pied Wagtail.—Far scarcer and later than usual. It was fairly abundant in the vicinity of the coast on Sept. 22nd. I noticed a couple at Grainsby on Nov. 14th.

M. melanope, Pall. Grey Wagtail.—One—a young bird—running about on the top of the greenhouse at Grainsby on Oct. 14th.

M. raii (Bonap.). Yellow Wagtail.—A fine old bird by the side of a creek at Tetney on July 23rd, and a couple of young birds at North Cotes on Sept. 20th.

Anthus pratensis (Linn.). Meadow-Pipit.—Very numerous along the coast and in neighbouring turnip-fields on Sept. 19th.

A. obscurus (Lath.). Rock-Pipit.—The first Rock-Pipit on the side of North Cotes Sluice on Sept. 26th, and about half a dozen on the "fitties" on Oct. 17th.

Muscicapa atricapilla, Linn. Pied Flycatcher.—Two or three Pied Flycatchers on Sept. 7th, with Whitethroats, and a single bird which I shot on Oct. 18th—an exceptionally late date.

Hirundo rustica, Linn. Swallow.—Thousands of Swallows along the coast at Tetney and North Cotes on Sept. 20th. They

began to get scarce during the first week of October, but on the 10th I noticed a large flock passing S. over Grainsby at such an immense height that they were scarcely visible, looking like grains of sand. Last seen Oct. 15th.

Ligurinus chloris (Linn.). Greenfinch.—Very abundant in reeds and hedges near the coast on Oct. 17th. The flocks consisted of both males and females, and, I think, some young birds; about a third were old cocks. Not nearly so numerous on 18th.

Coccothraustes vulgaris, Pall. Hawfinch. — Less numerous than usual. I saw a few during the first week of November.

Passer domesticus (Linn.). House-Sparrow.—The first large flock appeared in the stubbles near the coast on Oct. 8th. The Sparrow took part in the great migratory movement of mid-October, large flocks, in company with Tree-Sparrows, Redwings, and Rooks, frequenting the fields adjoining the sea-shore on the 13th, and still larger numbers on the 29th.

P. montanus (Linn.). Tree-Sparrow.—I noticed a few Tree-Sparrows among a large flock of the common species on Oct. 8th at North Cotes, and some small flocks on the 18th. The principal immigration, however, took place in November, and the species was very abundant in the vicinity of the coast on Nov. 12th and 20th, on the latter date in large flocks. In almost every case these birds were associating with the House-Sparrow.

Fringilla cœlebs, Linn. Chaffinch. — A good many Chaffinches—all old cocks—in the hedges near the coast on Oct. 13th. Again, on 20th, flocks were passing over Grainsby in the morning, and I saw many near the coast, apparently all cocks. On 25th a very large flock was feeding on the stubbles at Beesby on the wolds, and, as far as I could see, they also consisted entirely of cocks.

F. montifringilla, Linn. Brambling.—Though a great beech-mast year, Bramblings were almost entirely absent. A single bird near the sea-bank at North Cotes on Oct. 20th was the only one I noted.

Linota cannabina (Linn.). Linnet. — Very large flocks of Linnets frequented the fields near the coast and the foreshore from the middle of September to the middle of October, when they gradually disappeared.

L. flavirostris (Linn.). Twite.—A flock of about twenty Twites came in at North Cotes on the evening of Oct. 17th. On the following day I found one large flock and several small parties on stubble-fields near the coast, and on the 20th some large flocks were feeding on the "fitties."

Emberiza miliaria, Linn. Corn-Bunting.—Hundreds in the turnip-fields at North Cotes on Sept. 20th. Again, on Oct. 8th, a considerable number in the turnip-fields near the coast, and on the 13th a good many, with Yellowhammers, in the stubbles at North Cotes.

E. citrinella, Linn. Yellowhammer.—On Oct. 1st, and again on the 8th, a considerable number of Yellowhammers appeared in the coast hedges and adjoining land, and they were very abundant in the stubbles on the 13th.

E. schæniclus, Linn. Reed-Bunting.—Several Reed-Sparrows along the coast and adjoining hedges on Oct. 17th, all being females or young. On the 29th a good many on the "fitties," and in reeds and hedges in the vicinity of the coast; and on Nov. 12th they were very abundant in the seaside hedges, males and females being present in equal numbers.

Plectrophenax nivalis (Linn.). Snow-Bunting.—Almost entirely absent. On Nov. 8th I observed a couple on North Cotes sands, one an old very white bird, the other immature.

Sturnus vulgaris, Linn. Starling.—A few small flocks of Starlings appeared on Tetney "fitties" on Aug. 10th. On Sept. 27th Starlings swarmed in flocks of many thousands everywhere on the coast marshes and on the "fitties," an enormous immigration having undoubtedly taken place during the previous night. On Oct. 13th small numbers were coming in from the sea all day until about three o'clock, and again on 17th small flocks, with Peewits, coming in from N.E. until 3.30 in the afternoon.

Corvus monedula, Linn. Jackdaw.—A few Jackdaws took part in the great immigratory flight of Rooks on Oct. 20th. Once three came in alone, but the majority mingled with the flocks of their larger relatives. The direction of flight was N.W., almost in the face of a stiff N.N.W. breeze. One or two stragglers again appeared on the coast in company with Rooks on Nov. 1st.

C. corone, Linn. Carrion-Crow.—Two or three Carrion Crows appeared on Tetney “fitties” on Oct. 13th. On the 23rd I noticed over a hundred of these birds coming in to roost in Fenby Top Wood, a considerable increase in their numbers having apparently taken place about this time.

C. cornix, Linn. Grey Crow.—Two on the sea-bank at North Cotes on Sept. 27th, but no more until Oct. 8th, when a couple were seen at Grainsby. Grey Crows took part in the great movement of Oct. 20th, and were passing to N.W. along the shore all day until about 3 o'clock, either singly or in small parties of four or five flying close to the sand.

C. frugilegus, Linn. Rook.—The Rook was almost the only bird whose immigration during the past autumn assumed unusual proportions. Commencing on Oct. 8th, the passage of this bird reached its height on the 20th, and terminated about Nov. 1st. The flight of Oct. 20th was one of the largest that I have ever witnessed. On reaching the coast I observed an unbroken stream of Rooks travelling steadily to the N.W., almost in the teeth of a stiff N.N.W. breeze. The flock was scarcely more than fifty yards wide, and the birds were flying close to the ground, only rising to clear hedges, trees, or buildings which obstructed their line of flight. I watched the passage for about half an hour, and it was still progressing when I left. Numerous other flocks, large and small, were also coming in from the sea; but the passage came abruptly to an end at one o'clock.

Alauda arvensis, Linn. Sky-Lark.—The Sky-Lark was less numerous on migration than usual. The passage took place, between Oct. 12th and 20th, the direction of flight being generally N.W. On 13th, however, the flocks were moving S. And on the 20th, although the bulk were passing N.W., several flocks went S.W.

Dendrocopus major (Linn.). Great Spotted Woodpecker.—I saw one of these Woodpeckers at Fenby on Oct. 21st, and a second at Grainsby on 26th.

Cuculus canorus, Linn. Cuckoo.—On July 16th I observed two Cuckoos on hedges near the coast.

Asio otus (Linn.). Long-eared Owl.—I flushed two or three of these Owls in a small plantation near the sea shore on

Nov. 15th. They were the only Owls that I saw on the coast during the autumn.

Accipiter nisus (Linn.). Sparrow-Hawk. — First seen on the coast on Sept. 27th, and fairly numerous on Oct. 1st and 4th.

Falco peregrinus, Tunstall. Peregrine. — First seen on Oct. 14th at Brigsley. A second perched on a dead tree in Grainsby Park on 19th, and on 30th one flying over Fenby Wood.

F. æsalon, Tunstall. Merlin. — Only seen once—a young female—at Saltfleet Haven on Sept. 22nd.

F. tinnunculus, Linn. Kestrel. — Fairly numerous on the coast during the autumn, particularly between Sept. 20th and Oct. 4th.

Ardea cinerea, Linn. Heron. — Herons were very numerous on the flats at Tetney by the middle of July, mostly young birds. On Oct. 13th I saw a party of seven or eight on Grainthorpe "fitties."

Botaurus stellaris (Linn.). Bittern. — Since I left Lincolnshire I heard that a Bittern had been shot at North Cotes on Dec. 24th.

Anser brachyrhynchus, Baillon. Pink-footed Goose. — Wild Geese were more abundant than in any recent winter. The first flock, numbering thirty-three birds, passed over Tetney Lock on Oct. 11th, and other flocks were frequently seen all through October and November. On the 14th of the latter month one of the largest migrations of Geese that I have ever witnessed took place. On that morning, between 8 and 9 o'clock, seven large flocks passed over Grainsby from W. to E. The number of birds in each flock varied from about two hundred in the largest to under thirty in the smallest, and all were well out of gunshot.

Tadorna cornuta (S. G. Gmelin). Sheld-Duck. — I saw a Sheld-Duck on a freshwater creek near the coast at North Cotes on July 16th.

Anas boscas, Linn. Mallard. — Mallards were unusually scarce on the coast throughout the winter.

Spatula clypeata (Linn.). Shoveler. — Two old female Shovelers on a pool of water at Tetney behaved as though they

had broods in the reeds on July 16th, but I could see no young Ducks of any sort.

Nettion crecca (Linn.). Teal.—The first pair appeared on July 16th, and the species had become abundant by the 30th.

Mareca penelope (Linn.). Wigeon.—I shot a couple of young birds on North Cotes sluice on Sept. 19th. A great many Wigeon visited the Humber during the winter.

Turtur communis. Selby. Turtle Dove. — Last seen on Sept. 20th; two young birds at North Cotes.

Crex pratensis, Bechst. Land-Rail.—Last seen on Sept. 24th; a single bird in a Turnip field at Tetney.

Porzana maruetta (Leach). Spotted Crake.—Only seen once; a single bird in some reeds near the coast at Tetney on Sept. 20th.

Rallus aquaticus, Linn. Water-Rail.—Appeared somewhat later than usual. I saw a couple near the coast on Nov. 8th.

Charadrius pluvialis, Linn. Golden Plover.—I saw a couple of Golden Plovers at North Cotes on Aug. 17th, and the keeper reported a flock of thirty at the same place on Sept. 1st. Some were heard passing over Grainsby early on the morning of Oct. 22nd, and a flock of about forty appeared on the coast on Nov. 20th.

Squatarola helvetica (Linn.). Grey Plover.—A few along Tetney Haven on Aug. 8th, and a considerable number on the sands and “fitties” at Grainthorpe Haven on Oct. 13th.

Vanellus vulgaris, Bechst. Lapwing.—The migration of the Peewit was an unusually heavy one, commencing on Oct. 9th, and continuing daily until the 20th. A second but somewhat smaller immigration took place between Oct. 29th and Nov. 8th. The direction of flight was N.W. in almost every case, and the passage usually came to an end about 2 o'clock in the afternoon. On one day only (Oct. 17th) it lasted until 4 o'clock. On Nov. 18th several flocks passed over to N.

Hæmatopus ostralegus, Linn. Sea-Pie.—Very scarce throughout the autumn. A few small flocks appeared on Oct. 8th.

Phalaropus hyperboreus (Linn.). Red-necked Phalarope.—A Red-necked Phalarope was sent to me at the end of October by a North Cotes Plover-catcher, who informed me that he had

caught a similar bird a few days previously, but had kept it too long, and allowed it to spoil (*ante*, p. 72).

Scolopax rusticula, Linn. Woodcock.—Much scarcer than usual. First appeared on Oct. 17th. The main flight, however, did not occur until Nov. 5th and 6th, in thick foggy weather with S.E. wind.

Gallinago caelestis (Frenzel). Snipe.—Arrived early, and in considerable numbers on Sept. 19th and 26th. The principal flight, however, appeared almost simultaneously with the Woodcock between Nov. 1st and 8th.

G. gallinula (Linn.). Jack Snipe.—I shot a couple of Jacks on Sept. 26th, and found considerable numbers on Oct. 13th, 18th, and 29th.

Tringa alpina, Linn. Dunlin.—First seen July 30th. Were very scarce all the autumn.

T. canutus, Linn. Knot.—A few small flocks came in on Aug. 10th, and some larger ones on Sept. 22nd. On Nov. 20th, after some very rough weather on the North Sea, great clouds of Knot appeared on the North Cotes sands.

Totanus hypoleucus (Linn.). Common Sandpiper.—Two or three Sandpipers appeared on the marsh drains on July 16th. By the 23rd they were fairly numerous, and I saw the last on Sept. 19th.

T. glareola (Gmelin). Wood-Sandpiper.—I saw a Wood-Sandpiper on a freshwater creek near Tetney Lock on July 23rd, and another, or perhaps the same bird, on Aug. 8th.

T. ochropus (Linn.). Green Sandpiper.—I observed several of these birds on the marsh drains and creeks near the coast on July 16th. Very few remained after the middle of September.

T. calidris (Linn.). Redshank.—Unusually large flocks frequented the "fitties" at Tetney and Grainthorpe at the end of September, particularly on the 22nd and 27th.

T. canescens (Gmelin). Greenshank.—Appeared on Tetney "fitties" on Aug. 10th. Last seen on Grainthorpe "fitties" on Sept. 22nd.

Limosa lapponica (Linn.). Bar-tailed Godwit.—Very scarce. I did not see any until Oct. 8th, when a few small flocks appeared on North Cotes sands.

Numenius arquata (Linn.). Curlew.—On the nights of July 22nd and 27th I heard the cries of Curlews passing over Grainsby, apparently travelling from E. to W. A few appeared on the coast on July 30th, but were less numerous than usual until Oct. 8th, when some large flocks came in.

N. phaeopus (Linn.). Whimbrel.—Two or three on the coast on July 30th. A large flock passed over Grainsby on the morning of Aug. 10th. Last seen on the coast on Sept. 22nd.

Sterna minuta, Linn. Little Tern.—A flock of six immature birds of this species on the coast at Donna Nook on Sept. 22nd. The Arctic Tern was very abundant about this time.

Mergulus alle (Linn.). Little Auk.—A living example of this species was found in a drain at the inland parish of North Thoresby by a labourer, but it was dead when it reached me. The weather in the North Sea had been extremely bad for some days previous to its appearance.

Podiceps fluviatilis (Tunstall). Little Grebe.—Two of these little birds appeared on North Cotes sluice on Oct. 13th, one of them being in perfect breeding plumage.

ON THE WINTER SINGING OF THE SONG-THRUSH (*TURDUS MUSICUS*).

BY W. WARDE FOWLER, M.A.

TOWARDS the middle of last November I was struck, like many others, by the vociferous singing of Song-Thrushes; they were unusually numerous, and almost every individual seemed to be uttering some kind of song, and continuing it more or less from early morning, when the voicefulness was at its highest point, till sunset, and even later. At the same time it happened that there came into my hands an interesting work on the song of birds by Dr. V. Häcker, of Freiburg-in-Breisgau, in which I found some useful remarks on the autumn and winter singing of birds, which seemed to point to the desirability of further close observation out of doors. I was then living close to the Park at Oxford, and was in the habit of going out daily before breakfast, as well as of crossing the Park two or three times a day on my way to and from college; and I determined to note down each day throughout the winter what birds I heard singing, and especially to record the voicefulness of the Song-Thrush. This I continued to do until the middle of March. My chief object was to ascertain, if possible, whether the great outburst of song which I had noticed was psychologically connected with the breeding season, or should be reckoned by itself as merely the expression of bodily comfort, arising from abundance of food and a mild temperature.* I wished to know how long it would go on without interruption—whether there would be any considerable break before the true spring song began, and, if so, how far it would be due to a change of temperature. I did not, as will be seen, arrive at any very definite conclusions, but I hope to be

* On this disputed question see Darwin, 'Descent of Man,' ii., 51 foll.; Wallace, 'Darwinism,' 384; W. P. Pycraft, 'Story of Bird-life,' p. 93, foll.; the writer's 'Summer Studies,' ch. vi; and references to German views will be found in Häcker, 'Der Gesang der Vögel,' p. 29, foll.

able to continue observing with more certain result in future winters.

In the 'Zoologist' for 1894, pp. 410, foll., Mr. O. V. Aplin had a short paper in which he clearly distinguished the autumn song of some birds—*e.g.* the Robin and the Chiffchaff (*i.e.* the song resumed after the moult, often feeble and imperfect)—from the winter song, which in some cases begins in November, and continues more or less regularly till breeding begins: this winter song (if I understood him rightly) he regarded as undoubtedly the beginning of the spring or breeding song. Dr. Häcker does not express himself quite so decidedly, and, on the whole, he seems disposed to take a different view; and as his remarks are interesting in several ways, and are the result (as he tells us in his preface) of twenty years' observation, I take leave to translate them here ('Der Gesang der Vögel,' p. 52):—

"In the renewal of song in autumn, when the Robin (*Erythacus rubecula*), the Blackbird (*Turdus merula*), and the Chiffchaff (*Phyllopneuste rufa*) are conspicuous, we have to do, in distinction from the summer song, exclusively with a kind of voice-play (*Spielstimmung*), as Darwin pointed out; in fact, with a psychical condition, which, for example, is to be found in adult dogs, which delight in play, and invite their masters to join them.

"The same holds good in part for those birds which, in the middle of winter—*i.e.* long before the beginning of the breeding season—let us hear their song. To these belong the Wren (*Troglodytes parvulus*), whose breeding falls in April, and the Dipper (*Cinclus aquaticus*), which normally has its first brood in April, and its second in June. Here we have to do with birds which are exceptionally robust, and whose perfect adaptability to a winter climate is plain from the fact that here at least (*i.e.* in Breisgau) they are true residents with a limited winter range. A few hours of winter sunshine is enough to produce in these birds that increase of bodily and psychical comfort which leads to the use of voice-play.

"I have attempted above to explain the meaning of the different sexual cries in connection with the preservation of the species. Only in a few cases—namely, in those of the autumn and winter song of a few resident species—are we unable to assign to song a positive importance for the preservation of species or individual.

But the caution needed in dealing with these negative instances is well shown by the example of the Crossbill. It is common to quote this bird as an example of abnormal habit in the physiological sense, since it usually pairs and sings in December and January, breeds in February, and hatches its young in March. Naumann has already pointed out the meaning of this: the bird performs the work of propagation and rearing precisely in the months in which its chief food, the cones of pines, are at their ripest and best, so that the parent birds find it then easiest not only to feed themselves, but to supply their young with the seeds which they convey to them in their crops."

It will be seen from this passage that Dr. Häcker, like Mr. Aplin, clearly separates the true autumn song, heard after the moult, from the winter song which often begins in November; and with this conclusion most field ornithologists will probably agree. As to the meaning of the winter song, he is not so clear; apparently he takes it as in part "voice-play," the result of abundant food and bodily comfort, and as having no immediate connection with breeding, but adds a useful caution suggested by the case of the Crossbill. My observations of last winter, so far as they go, seem to support both his explanation and his warning.

It was on November 17th, a very uncomfortably chilly day, that I first made a note of the great number of Thrushes in song. No doubt Central and Southern England had been visited by a large immigration from the north and east. It was dull, moist weather, chilly rather than cold, and unusually still. I am convinced, though I cannot prove it, that not only old males, but young birds, and even females, were using their voices to swell the chorus: every bird seemed to be making some sort of noise, and there was every variety of performance, from the full, clear utterance of the practised singer to the harsh and wheezy notes of the novice or the female. As I have already said, this vocal activity continued in full swing, without apparent diminution of the numbers, until December 8th, when I left Oxford for the Christmas vacation, the weather all the time being mild and damp. I did not observe any distinct sign of courting or sexual activity.

After leaving Oxford, I was at Kingham, in the north-west of the county, until January 18th, and continued my notes there.

When I arrived the singing was still going on, and I was told that it had attracted notice, as elsewhere. It continued in full strength till the 15th. From that day till January 3rd, in rather colder weather, varied by warm days and cold fog, I heard occasional singing only, as one ordinarily does in mid-winter; on December 20th, 25th, 28th, 31st, which were stormy days, the birds were silent, and left the field vacant for the Mistle-Thrush. Though there were plenty of Song-Thrushes still to be seen, as well as occasionally heard, I think there was a decided diminution in the numbers during the last half of the month. From January 3rd to January 21st, with the temperature varying at 9 a.m. from 25° to 42° , I failed to detect the voice of a single bird of this species.

It may be useful to exhibit the diminution of song between December 15th and January 3rd in the form of a table:—

Dec. 15.	Therm. 38° .	Dull and damp. Not many Thrushes singing.
„ 16.	„ 42.	Fine. Not many songs.
„ 17.	„ 42.	Feels colder and drier. Very few songs.
„ 18.	„ 45.	Open and mild. Few songs.
„ 19.	„ 33.	Very fine. Much singing, including Mistle-Thrush.
„ 20.	„ 46.	Strong gale from south. Only Mistle-Thrush singing.
„ 21.	„ 38.	Fine. Several Thrushes singing.
„ 22.	„ 28.	Fine and frosty. Two Thrushes sang.
„ 23.	„ 25.	Cold fog. One Thrush sang.
„ 24.	„ 30.	Very cold dense fog. One Thrush sang at 9.30.
„ 25.	„ 52.	Warm and drizzly, with wind. Mistle-Thrush only.
„ 26.	„ 42.	Soft day after rain. One Thrush sang after sunset.
„ 27.	„ 45.	Wet and rough. Two or three Thrushes sang.
„ 28.	„ 45.	Heavy gale from west. Not a voice.
„ 29.	„ 30.	Very fine. No Thrushes sang.
„ 30.	„ 40.	Dull and drizzly. Heard one Thrush.
„ 31.	„ 38.	Great gale. No birds singing.
Jan. 1.	„ 35.	Cold rain. One or two Thrushes sang.
„ 2.	„ 28.	Fine and sunny. One Thrush sang.

On January 3rd a short period of cold and foggy weather set in, with one heavy fall of snow. I heard no Thrush during this cold weather, nor during the very rapid thaw of the 9th and 10th; nor did two fine days, the 14th and 15th, which brought out the love-note of the Blue-Tit, and all but induced the Chaffinch to begin, stimulate our Thrushes to start their song again. I returned to Oxford on the 18th, a warm, damp day (therm. 42°),

where I found many birds full of voice, but not the Thrushes. On the 21st, however, with the temperature 45° , and a feeling of spring in the air, there was a general awakening, and this continued till the 29th, when another spell of cold began, and, in spite of one or two fine days, silence prevailed. On February 4th (therm. 28°), a cold but still day, they sang again freely; and from this time onward may be said to have continued in song, with occasional interruptions, but never in the same numbers, or with the same noisy vociferation, as in the autumn.

The conclusions to be drawn from these observations are not altogether clear to me; but I may venture upon a few remarks on them.

First, as to the general conditions of voicefulness, I think it may be safely said that you will not hear the Song-Thrush in strong wind, nor snow, cold fog, or other uncomfortable wintry weather. What really spurs them to sing is still, open weather, when food is easy to get at: sunshine is not a necessity, and the temperature is of no great account until it becomes really low, and continues so for some days. For example, on March 25th, when I was writing these notes, a bitterly cold day of snowstorms, a Thrush was singing finely at 6.45 p.m., with the thermometer at 26° .

Secondly, as regards the meaning of winter song, and its possible connection with breeding, the entire silence of this species between January 3rd and January 21st might suggest a distinction between a winter song, stimulated only by the enjoyment of food and bodily comfort, and the true spring or breeding song. I do not, however, feel by any means sure that such a distinction is to be drawn, without modification; I am inclined to think that the great outbreak of song in the autumn was, in the case of mature birds at least, a forecast of the coming breeding-season. This species is an early breeder, and eggs have been found as early as February 28th*: and the silence in January might have been accidental, or have occurred at another time, according to the weather, just as it may also sometimes be noticed in April or May. Birds that have already lived through one or more breeding-seasons must, I should imagine, have come to associate the full vocal powers they have acquired with the joys

* H. Saunders, 'Manual of British Birds,' p. 4 (2nd edition).

and duties of that time, and may revert to it by association of ideas when they are well-fed and comfortable in November and December. But the majority of the singers of last autumn—immigrants, birds of the year, and females—were very possibly using their voices only in what Dr. Häcker has called “voice-play.” Thus, if by any chance I am right, there is a twofold element in the winter song of this species; but further observations may be expected to correct or modify a conclusion which I only advance with hesitation.

It may be as well to add that in the North of England the Song-Thrush does not seem to be a familiar winter singer, no doubt owing to the southward migration of this species in the autumn. I am never myself in the north during the winter, and have to rely on the evidence of others; but I find Waterton, in his characteristic essay on the Stormcock, describing the latter bird as “cheering us with his melody during the dreary months of winter when the Thristle and the Lark are silent.” Lately Mr. E. P. Butterfield, of Wilsden, near Bradford, in the natural history column of the ‘Yorkshire Weekly Post’ (Dec. 29th, 1900), asked “whether any of your readers have heard the Song-Thrush in full song in Yorkshire in December”; and added that he himself had not, even in the most favourable season.

I add a few notes about the winter singing of our two other common Thrushes, the Mistle-Thrush and the Blackbird. The former bird is a curiously irregular singer, and in his habit of singing in the face of a strong wind he stands alone. I did not notice him this year till December 19th, and it is in December, I think, that his voice is most conspicuous. That the mid-winter singing of this species is the beginning of the spring or breeding song is almost certain; for he is a very early breeder, and is rarely in difficulties for food to support his vigorous vitality. Like the Crossbill, he finds much of his favourite food in perfection in December and January—*viz.* the berries of the ivy, yew, mistletoe, &c.

As regards the Blackbird, it is worth noting that, in the passage translated above, Dr. Häcker mentions this species as regularly singing after the moult (*i.e.* in September) at Freiburg-Breisgau; and Gilbert White says the same of the Selborne Blackbirds (letter xl. to Pennant, and letter ii. to Barrington).

As neither I nor any of my friends have ever heard it at that time, I wrote to Dr. Häcker for further information; but my letter never reached him, and was returned to me. White may probably have been mistaken; his statements in these two letters seem to have been the result of only a single year's observation. Mr. Witchell quotes White in his 'Evolution of Bird-Song,' p. 65, adding that he had probably heard the *young* birds sing; and recently explained, in a letter to the 'Yorkshire Weekly Post,' that he has often himself heard young Blackbirds pipe in autumn, but has never heard the full song at that season.

In winter the Blackbird is an occasional, but only an occasional singer.* I have never heard him myself between July and January, and rarely before the middle of February; and Mr. T. Phipps, an observer upon whom I can fully rely, and who was postman in this district for fifty years, assures me that his experience has been the same. Mr. Aplin, however, sends me word that he has heard it this winter on December 7th, 12th, and 22nd, singing in a low tone, but adds that he considers it most unusual for a Blackbird to sing in autumn, or before its usual time. Its song is, no doubt, often confused by casual observers with the notes of the Mistle-Thrush, Starling, or even the Song-Thrush. When it is heard earlier than January, the song is probably to be connected with the breeding instinct, rather than explained as mere "voice-play."

* I have collected a good deal of evidence on this subject, and on the winter singing of other species; but this paper has become quite long enough already.

NOTES AND QUERIES.

MAMMALIA.

CARNIVORA.

The Aardwolf (*Proteles cristatus*) in the Transvaal Colony.—On Aug. 10th, 1900, when coming back from a visit to Zuurfontein Station, I saw an Aardwolf out on the veld. I drove towards him, but he took no more notice of me than he would of a post. When I got to within a distance of about twenty yards from him he looked up and stared at me. I approached a few yards nearer: there stood the brute in broad daylight, not fifteen yards distant, contemplating me with the utmost *sangfroid*. I called out, whereupon he uttered a few snorts or grunts, and made off at a clumsy trot, his hind quarters sloping so much as to appear a burden to him. After putting a dozen yards or so between us, he stood still again, and watched me slyly. He appeared to be doing an extraordinary thing, *viz.* stalking "Crown-headed" Lapwings, or "Kwikies," as they are locally termed, as he quietly continued to slink after them. His utter contempt for my presence seemed to point to the fact that he knew perfectly well I had not the wherewithal to harm him. After shouting and driving towards him, he made off again at a trot, every now and then breaking into a clumsy gallop, and ever and anon standing and looking back. It was half-past five in the afternoon, and the sun was not yet touching the horizon. Extreme hunger could have alone driven the brute out at such an hour. A few evenings before a friend of mine shot one about three miles from the spot where I saw my specimen, though it was absolutely dusk and among trees, whereas my animal was out on the flat veld.—A. C. HAAGNER (Modderfontein).

[This animal appears to be changing what was considered as its purely insectivorous diet. Mr. W. L. Sclater ('Mammals of South Africa,' vol. i. p. 82) has recently recorded that farmers have found that their sheep and kids are attacked by this animal; and Mr. Haagner has now seen it hunting Lapwings. Nicolls and Eglington, in their 'Sportsman in South Africa,' seem to correctly describe the food of this animal as consisting "of insects and reptiles, as well as small animals (mammals) and birds."—ED.]

Suggested Mimicry of the South African Weasel.—It seems possible that the Snake-Weasel (*Pœcilogale albinucha*) of South Africa mimics the Polecat or Muishond (*Zorilla striata*) of the same region. How this is done, in what direction it lies, and the reasons, I will proceed to try and explain, or rather offer the following explanation:—Both these animals are black with white stripes down the back; both are moreover very much alike in looks, notwithstanding the marked generic differences. Now "*Zorilla striata*" is defended by its power of emitting a strong odour at will, thus resembling the American Skunks, and "*Pœcilogale albinucha*" is not so defended. As they reside in much the same localities, and, as far as I know, their habits are also similar, we may infer herefrom that the latter animal mimics the former. The Stink-muishond, as the mimicked is generally called in South Africa, is nocturnal, although it may be, and has been, caught wandering about shortly before and after sunset. They are noted poultry-stealers, and if one, during a nocturnal visit to a poultry-yard, happens to be disturbed or irritated in any way by something or other which may cause the animal to emit the renowned (?) stench, the smell is fearful and very apparent to anyone entering the poultry-yard next morning, and may hang about the place for days. I have seen this animal chased by Dogs, and no sooner did they get near the Polecat than it halted, humped up its back, emitted a sort of purr, raised the long hair on its back, and—phew! the Dogs made off in the opposite direction, howling dismally. Sportsmen-friends of mine tell me that Dogs do attack this animal.* In this case they have another trick to fall back upon—that of feigning death. Here the smell always present in the animal must no doubt assist in completing the delusion. I have myself seen one, on getting timely knowledge of the approach of Dogs, quietly stretch itself out and feign death, allowing the canine enemy to approach quite close, and even smell it. The Dogs in this case do nothing but walk away again. Now the Weasel, through natural selection—adaptation to circumstances—may mimic the warning colours of the Polecat. In addition to this it feigns death as good as the mimicked animal, and, what is more, has much the same odour as the Polecat, without the gift of being able to emit the awful stench so characteristic of the former. I would be very glad if any reader of 'The Zoologist' would give his experiences or ideas, either to corroborate the above or prove it without foundation. I think it well worth while investigating, and as matters stand I think I am justified in my opinions and deductions. Of course, until more is known of the habits of these two animals, one will never be able to reason clearly.—ALWIN C. HAAGNER (Modderfontein, Transvaal Colony).

* The Polecat is, however, bound to have many enemies less plucky than a Dog.—A. C. H.

RODENTIA.

Climbing Powers of the Long-tailed Field-Mouse.—In 1899 my friend Mr. C. Oldham contributed a note to 'The Zoologist' (p. 27) on the climbing powers of the Long-tailed Field-Mouse, in which he described its habit of using an old birds'-nest as a platform on which to eat the hips gathered from the wild rose trees, or acorns carried up from the ground. For some time before we captured a number of Long-tailed Field-Mice on these nests, we had been puzzled by the litter of gnawed kernels and pulp which filled the nests, and, although we made many enquiries, we could not find out that anyone had ascertained what species was responsible. A few days ago I was looking through a volume of children's poems—Mary Howitt's 'Sketches of Natural History,' 1834, and I came across the following verse in a poem on the Wood-Mouse:—

"In the Hedge-Sparrow's nest he sits,
When its summer brood is fled,
And picks the berries from the bough
Of the hawthorn overhead."

From the context it is perfectly clear that Mary Howitt refers to *Mus sylvaticus*. In nests, besides hips, we have found haws, seeds of the blackberry and holly, and stones of the sloe, from all of which the kernel has been extracted in a similar manner by chiselling off one end.—T. A. COWARD (Bowdon, Cheshire).

The Coloration of the Variable Hare.—My friend Mr. Coward's note on the above subject (*ante*, p. 73) interested me not a little, especially in regard to some questions indirectly touched therein. Firstly, regarding the introduction of Scotch Hares into England or Wales, and the retention by them when in presumably milder surroundings of their original white winter coloration, I am aware of several similar instances. In fact, it may be taken as the *rule*, that when variable Hares are transferred from Scotland to some more southern country they will continue to assume their white winter coat, apparently to the same extent as when in their natural surroundings. Sooner or later, however, the habit is usually dropped, but I am in want of exact statistics as to the manner in which the change is effected. I am not aware, in fact, whether the originally transferred individuals gradually change less and less white in each succeeding season, or whether it is only in their progeny that the white colour ceases to appear. Mr. Coward's letter seems to supply a fact of interest in this connection, since he states that the Hares which formed the subject of his note are the descendants of some Perthshire animals which were exported about twenty years ago. In this case, unless, indeed, the climate of their new home is sufficiently severe to keep the white winter coat in constant use, we might perhaps assume that the loss of the winter coat may not be effected even after a

period of twenty years. Secondly, Mr. Coward's words—"the Hares were still in their white winter pelage, though most of them had already patches of brown about the head and flanks" (in March, 1899)—seem to imply his surprise that the mild weather had not the effect of causing the Hares to reassume their darker pelage. Now it is my experience that, whatever be the cause and date of the assumption of the winter coat, once assumed it cannot be thrown off until the regular annual moulting time—in my experience the first week of May. Thus I have already recorded the incongruous spectacle of a Hare of Scotch blood browsing the flowery pastures of late April in the South of Ireland, the while clothed in a conspicuous livery of white. And the same thing happened in the case of a Hare kept captive at Cambridge. The patches of brown seen by Mr. Coward were not then, as his remarks would imply, the advance guard of the dark coat of summer, but the rearguard of that of the previous summer, to which the winter change had never extended. Before concluding this short note, I should like to mention (what, indeed, has been partly the cause of my having written) how grateful I shall always be for any information which may tend to throw light upon the interesting question of winter whitening in animals.—G. E. H. BARRETT-HAMILTON (Kilmanock, Arthurs-town, Waterford, Ireland).

AVES.

Curious Accident to a Young Mistle-Thrush.—A friend of mine in Hampstead caught a young Mistle-Thrush (*Turdus viscivorus*) in his garden, which was not old enough to fly, and put it into a cage to preserve it from Cats. On handling the bird the first time he noticed what appeared to be a skewer sticking out about half an inch near the left shoulder, and which was apparently securely imbedded. When examining the bird I found that a twig was firmly fixed, and upon pulling out the same with some effort it proved to be an inch and a half in length, and an eighth of an inch in diameter. The point was stuck into the membrane of the left wing close to the bend, and penetrated nearly half an inch below the skin. The bird did not appear to suffer any pain, though quite a deep hole was left where the twig had been. The piece of stick is before me as I write, and is clotted with some little blood, and a number of small feathers are adhering to the larger half. Had the bird not been relieved from the stick it is conceivable that the latter would have become even more firmly imbedded, and ultimately prevented the use of the wing altogether. The outer end of the twig has apparently been broken off, which tends to show that it may have been considerably longer when first it came in contact with the bird. One solution as to how the bird became transfixed is that it may have fallen out of the nest on to a small branch with an upturned

sharp-pointed twig, and in falling the latter, being firmly fixed in the bird, was broken off from the main stem.—BASIL W. MARTIN (Elm House, Hampstead).

Active Mimicry by the Chaffinch.—I recently observed the nest of a Chaffinch (*Fringilla caelebs*) near my house, in a hedge by the turnpike-road, and built in a blackthorn-bush in full bloom. In order, I imagine, to make the nest as little distinguishable as possible from its surroundings, the birds had dotted it all over with small pieces of white paper; one fragment which I detached appeared to be blotting-paper. Passing the place a few days since I noticed that all the bloom had fallen from the bush, and that all the pieces of paper had been removed from the nest. This had not been disturbed, and contained eggs. It seems a fair inference that the birds recognized that their object in putting the scraps of paper about the nest was likely to be defeated when the blossom fell away, and accordingly removed them. — R. H. RAMSBOTHAM (The Hall, Meole Brace, Shrewsbury).

Rose-coloured Pastor in Kent.—A fine adult male of the Rose-coloured Pastor (*Pastor roseus*) was obtained on May 14th last near Appledore, in Romney Marsh, Kent. It was sent for preservation to Mr. G. Bristow of this town, to whose kindness I am indebted for the privilege of examining the specimen in the flesh.—L. A. CURTIS EDWARDS (31, Magdalen Road, St. Leonards-on-Sea).

[This record is an interesting one to ornithologists, but describes a distinct disregard to the laws relating to a close-time for birds.—ED.]

The Lesser Spotted Woodpecker (*Dendrocopus minor*).—I have read Mr. Stanley Lewis's note (*ante*, p. 184) with much interest, but I regret that I cannot support his suggestion that this Woodpecker produces its vibrating sounds by any exercise of the laryngeal muscles. In a note which I drew up for Dr. A. G. Butler, and which he printed at length in 'British Birds, their Nests and Eggs' (vol. iii. p. 29), I have discussed the subject. The method by which the vibratory sound is produced is, that the bird employs its bill to strike one particular piece of bark again and again *with extraordinary rapidity*. It is not peculiar to either sex. Both sexes are expert in the production of this curious effect. In 1894 it was my good fortune to acquire a pair of Lesser Spotted Woodpeckers. They lived in an aviary-cage beside my bed, and entertained me with their lively actions from break of day onwards. They knew me so intimately that they allowed me to follow their every movement. I wrote pages and pages about them with the birds at my side, when the majority of people were sleeping soundly. The male died in the following winter, but the female lived in my possession until she escaped through an open window in the

summer of 1895. I feel sure that if Mr. Stanley Lewis will keep this Woodpecker in captivity, he will endorse my explanation of the way in which the sound which has interested him is produced. There is nothing so satisfactory as personal experience. — H. A. MACPHERSON (Pitlochry, N.B.).

Red-footed Falcon (*Falco vespertinus*) in Shropshire.—On May 18th a specimen of this rare Falcon was shot near Shrewsbury, and I examined it in the flesh. It is an immature female measuring 12 in. long; wing not quite 10 in. Amongst the contents of the stomach was an unmistakable Shrew (*Sorex vulgaris*). Few birds of prey except Owls will eat Shrews, probably because of their odour; so it is of interest to find that these form part of the diet of *F. vespertinus*. As the specific name indicates, this species seeks its prey chiefly in the evening. It has occurred twice previously in Shropshire (*cf.* 'Fauna of Shropshire,' p. 137). — H. E. FORREST (Shrewsbury).

Nesting of the Pigmy Falcon (*Microhierax eutolmus*) in Upper Burma.—The simple but wasteful system of taungya cultivation is pursued by a large proportion of the inhabitants of the villages in Upper Burma, and also by the wild tribes—Karens, Shans, Lishaws, &c.—who keep, as a rule, to the wilder tracts in the mountains. In cultivation by taungya, a patch of forest is chosen, often containing valuable timber, and the whole of the growth on it is felled, and left for a couple of months to dry, and then burnt, the ashes forming a rich manure. Occasionally a number of the larger hardwood trees, such as Pyinkado (*Xylia dolabriformis*), Pyinma (*Lagerstræmia flos-reginæ*), &c., are only girdled—*i. e.* the bark and sap-wood cut through all round, and the tree allowed to die and decay standing. These solitary dead trees in taungya areas are much frequented for nesting purposes by the various wood-boring birds—Woodpeckers, Nuthatches, Barbets, &c. On April 23rd, 1899, in a deserted taungya alongside the high road leading from Thabeitkyin, on the banks of the Irrawaddy above Mandalay, to Mogok, the site of the famous ruby mines of Upper Burma, I saw a Pigmy Falcon (*Microhierax eutolmus*) disappear into a hole on the under side of a branch excavated in a large dead tree. The dead and splitting bark and some horizontal lower branches made the ascent to the nest easy, and I was able to climb up and inspect the nest-hole. This was evidently once made by a Barbet, but whether the rightful owner had been ejected by the Falcon, or whether it was an old Barbet's nest-hole, I could not say; anyhow, it was occupied by the little Falcon. On enlarging the hole I was able to look into the nest, which was laid at the end of a tunnel dug out of the wood, about fifteen inches long. Nest, properly speaking, there was none, but where the tunnel ended in a slightly enlarged and oval chamber there was placed a fairly firm pad of chips of wood, a few leaves,

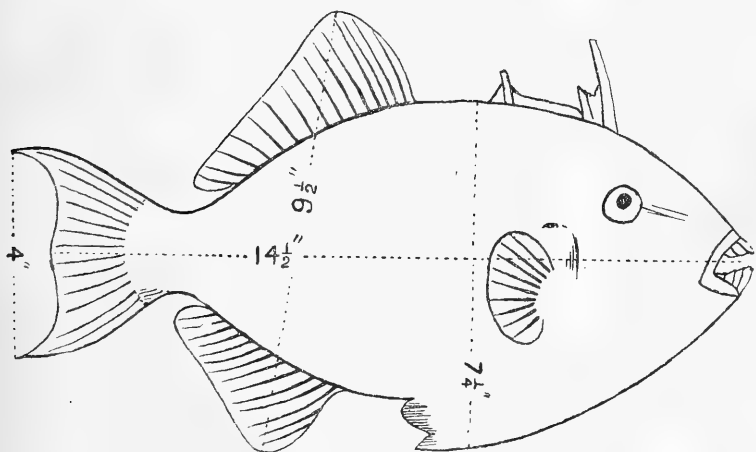
with an upper stratum quite two inches thick composed almost entirely of the wings of Cicadas, with a few butterfly and moth wings interspersed therein. To my disappointment, I found neither eggs nor nestlings. During the rifling of their nest both the male and female Falcons sat on a neighbouring tree, but made no demonstration of any kind. Further south, in Tenasserim, I found the eggs of this Falcon in a precisely similar situation early in April, as well as I can remember. That nest was composed almost entirely of butterfly wings.—C. T. BINGHAM.

AMPHIBIA.

Palmate Newt (*Molge palmata*) in Carnarvonshire.—On May 12th I found a small pond at the back of the Little Orme's Head teeming with Palmate Newts. There were also numbers of Great Crested Newts, but no Common Newts, nor could I find any of the latter elsewhere in the district. The male Palmate Newts were all showing in perfection the webbed feet and tail-filament characteristic of the breeding season. The females were still full of spawn, and some that I brought away have laid eggs since in the aquarium.—H. E. FORREST (Shrewsbury).

PISCES.

File Fish off Brighton.—Thinking it may interest the readers of 'The Zoologist,' I am sending (in place of a description) a rough sketch of



a File Fish (*Balistes capriscus*), taken about five miles off Brighton on the 10th October, 1900, which has been presented to the Brighton Museum by

Mr. W. F. Goodwin. Though common in the Atlantic, I believe its capture on this part of the coast is a very rare occurrence.—HERBERT S. Toms, Acting Curator (Brighton Public Museum).

[The above figure differs somewhat from that given by Couch, in which the apical margin of the tail and the outer margins of the fins are very much more concave. I have, however, compared the drawing sent us by Mr. Toms with a spirit specimen from Madeira in the British Museum, with which it agrees. Jordan and Evermann, in their recently published 'Fishes of North and Middle America' (p. 1701), describe its distribution as "Tropical parts of the Atlantic; occasionally northward in the Gulf Stream; very common on our coast and in the Mediterranean, rarely north to England." Under the name of *Balistes carolinensis*, they figure the species, in which the tail and fins differ from Couch, and agree with our diagrammatic figure.

Of this rare fish, Couch gives three instances in which it has been caught in British seas. In 'The Zoologist' (1868, p. 1027) Mr. Cordeaux reports a capture off the Flamborough coast; but Messrs. Clarke and Roebuck (Zool. 1884, p. 183) state that they had satisfied themselves that that fish was an Opah. In the same volume (p. 472) is an extract from the 'Field,' recording a capture near Folkestone in September of that year. The peculiar structure of the first dorsal fin is generally known. Frank Buckland wrote that he had shown it to his friend, a well-known gun and rifle maker of Newcastle-on-Tyne, who was so struck with its conformation that he promised to try and adapt its principle for some of his safety-rifle locks (Nat. Hist. Brit. Fishes).—ED.]

THE PROTECTION OF BRITISH BIRDS.

THE Society for the Protection of our British Birds—a society which is trying to do a great deal of good in many ways—some time ago offered two prizes of ten and five pounds respectively for the two best essays on the subject. These have just recently been awarded. The question of protection to be accorded to our British birds, many of which are sadly in need of it, is a somewhat difficult one to deal with. That overworked, heterogeneous combination known as the Government has, in these stirring times, but little space to devote to legislation on the matter; and even were legislation satisfactorily accomplished, there yet remains the still more difficult matter of enforcing the law. Unfortunately, as at present administered, the Wild Birds' Protection Act is, in many places, little better than a dead letter, and were it not that private enterprise frequently steps in, it would be reduced to a mere farce. What is the use of fining a man a nominal sum, when he has a wealthy collector behind his back, ready

and willing to pay all his expenses, with a substantial margin for himself to boot? Is this likely to prove any deterrent? I would have every bird that was not proved to be distinctly injurious to agricultural or horticultural produce properly protected for a certain season by a proper law, properly enforced; and should any *bonâ fide* collectors desire eggs or specimens of any particular species, they should, on payment of a fixed fee, receive a proper permit to acquire the same. When the true history of the gradual extermination of many of our rare and interesting birds comes to be written, a very heavy indictment will have to be laid at the door of the egg-robber, who takes every clutch that he can come across, if perchance one should differ slightly from the rest. Drainage and reclamation of the bird's favourite haunts, and the increase and spread of an ever-growing population, are very important factors in the case, but the trail of the egg-collector is over them all; and the worst of it is that many collectors pose as naturalists with their right hand, and with their left employ men, honest enough fellows as a rule, but in these hard times glad enough to earn an additional penny, to collect for them every clutch of the eggs of some particular bird that they can come across. Such a collector can only be compared to his ornithological prototype, that arch-robber the Carrion Crow. Birds which are rare in one particular place are generally pretty common in some other locality; and it has always been a mystery to me why such ridiculously high prices should be offered by collectors for certain British taken eggs, when these are common enough upon the Continent. The eggs of certain birds have acquired an altogether fictitious value, and as a consequence are practically farmed by certain people to whom their nesting haunts are known. Here in Yorkshire a great amount of good has been done by the extension of the close-season, so that now most of the vast concourse of sea-fowl that breed in the cliffs, in certain places, get off their young in safety; but before that happy event, as I have mentioned elsewhere, cruelty, which I can only characterize as damnable, used to be practised. So-called sportsmen used to go out, on the opening day, with the avowed intention of firing away so many cartridges; they never even troubled to pick up one quarter of what they shot; and I have witnessed the pitiable sight of a wounded Guillemot, with broken wing and its wounds exposed to the salt sea-water, trying to clamber up the cliff with a fish in its bill, to its starving young one, many of which perished through the death or maiming of their parents.

Conversant as I am with almost every phase of Yorkshire bird-life, I have often procured immunity for certain species by the judicious distribution of a little of the current coin of the realm; but at the same time I have at times been obliged to witness scenes of which I thoroughly disapproved, but which I was powerless to prevent; and so, to a certain

extent, like Naaman the Syrian, I have been compelled to bow myself down in the House of Rimmon. Ladies have much to answer for as regards the slaughter of birds. At a certain village on the coast a large trade is still done in shooting the beautiful Terns or Sea-Swallows, and the Kittiwakes, for millinery purposes. Seven boats used to be employed; now, I am glad to say, there are but two. Thanks to the afore-mentioned extension of the close-time, most of the Terns are gone, and the pretty tame little Kittiwakes provide the greatest number of victims. During the third week in October, 1899, 120 were shot in one day, 96 on another, and 60 on the morning of October 30th. Some 360 were shot during the week. A man from London was occupied in skinning the birds, which at this season will keep for about a week. Some 260 birds were hanging up on October 30th, waiting to be skinned. When this operation is over the birds are packed up and forwarded to London. Sixpence apiece is the price paid. Now, I do not blame the men who obtain these birds—they are hard-working, honest fellows, not overburdened with this world's goods—nearly as much as I blame those who employ them, or those who reap the fruit of their labours. *Qui facit per alium, facit per se.* The men pursue a perfectly legitimate calling, when everyone is free to shoot what they will; but this wholesale destruction of beautiful birds is very grievous, all the more so when one considers that it is perpetrated for the adorning of ladies' hats and bonnets; and I feel sure that if only those ladies who love to adorn themselves with birds' feathers, wings, and bodies knew half the abominable cruelty that is perpetrated, in various parts of the world, at the shrine of the Goddess of Fashion,—feathers plucked out of the living bird, wings torn off while they are yet alive, and the mangled remains thrown back on the salt-water to linger in agony, till death comes as a merciful relief to their sufferings,—they would for ever forswear ornaments purchased at the price of such terrible suffering. With regard to the senseless destruction of those most useful birds, Owls and Kestrels, I am very glad to say that a far more enlightened view obtains at the present day, both with game-preservers and with game-keepers, and it is comparatively seldom that one comes across their mangled remains hanging up in the keeper's "museums." That most excellent and practical ornithologist and lover of birds, the late Lord Lilford, used to say that the man who would shoot an Owl was only fit for a lunatic asylum, and the sheltering ægis of many a landowner is now extended to them. One thing I should like to see entirely abolished by Act of Parliament, and that is that most iniquitous institution known as the "pole-trap." I regard it as a veritable invention of the Evil One, and I make no excuse for having buried dozens of them. They not only catch the various species of Hawks and Owls for which they are set, but I have known Cuckoos, Nightjars, Wheatears, Ring-Ouzels,

Meadow-Pipits, and even Grouse to be caught in them ; and these unfortunate birds are often left for hours, sometimes for days, hanging in lingering misery with a broken limb, till either death from exhaustion, or a knock on the head from a belated keeper on his weekly rounds, at last puts an end to their sufferings. To my mind the best mode of opening the eyes of the public to the wanton and senseless destruction of birds, is by getting the children in the various schools interested in them, and taking them out at least on one afternoon during the summer months, and explaining to them the various birds, mammals, reptiles, insects, flowers, &c., that are to be met with in such a ramble ; also by the giving of lectures by practical people, who know what they are talking about, to the landowners, game-keepers, collectors, gardeners, &c. A vast amount of nonsense is unfortunately both talked and written upon the subject by the ignorant, and then far more harm than good is unwittingly wrought. Some few are, I believe, beyond reclamation.

Much may be done by private enterprise, and here in Yorkshire several of us, who are much interested in preserving from extinction some of our rarer breeding species, have employed a watcher with marked success. Many landowners and game-preservers only need to have the usefulness of certain birds pointed out to them, by those who know what they are talking about, to give immediate orders for their protection ; and children can be easily trained to take an interest in these things, and not destroy them. I would be the last to advocate Draconian methods, as in these days by so doing we should defeat the very object that we desire to attain, and many a well-known naturalist has been induced to take up some special study, through the pleasure derived from a day's bird's-nesting in his boyhood. Nor would I ever try to hinder the perfectly legitimate shooting of birds in moderation during the proper season ; but while I yield to no one in my love of sport—in pursuit of which I have sat for hours in a hole dug out on the mud flats, waiting for wildfowl to drift in with the tide or pass over at flight-time, with the thermometer standing at many degrees below freezing point ; have worked a single-handed punt on the flood water till my hands were so numb with ice and frost that when I got up to the Ducks I could hardly pull the trigger of the big gun ; and have been out at sea all day in a small yacht in a driving snow-storm, on the mere chance of a shot—yet I can safely say that I have never killed for killing's sake. The birds I have shot were mostly waifs and strays, here to-day and gone to-morrow ; and it gives me far greater pleasure and interest to lay aside the gun and rifle, and take up the field-glass and watch the birds at home in their natural haunts and surroundings. I would far sooner do this than destroy and preserve for my collection any of the rare and beautiful birds that would remain and breed with us, if only their arch-enemy, the man with the gun,

would allow them to do so. I believe most fully in the principle of "live and let live," and consider it a thousand pities that certain birds—*e. g.* game—should be protected at the expense of the extinction of certain other beautiful birds—*viz.* the Jay and the Magpie. Of course I well know that these two are inveterate egg-stealers, nor would I for a moment recommend too many to be kept on an estate, but a pair or two add much interest and beauty to the landscape; and I hold that no true sportsman would utterly exterminate these birds, even though they caused him to lose a few game-birds' eggs every year. In the same way I am glad to say that the stately though destructive Heron is not utterly exterminated on our trout streams, and I hope devoutly that it will be many a long day before such is the case. To sum up, I do not think that any real assistance can be expected from public bodies in the matter of bird protection. They hesitate to devote public funds to matters which they, in common with many officers of the law, look upon purely as a question of sentiment; and, therefore, if any real good is to be done, our sheet-anchor is private enterprise. We have legislation dealing with the matter, but unfortunately those who are most eager for legislation very often, when they have got it, are the most remiss in seeing that it is enforced.—OXLEY GRABHAM.

[Among the most destructive agents to bird-life, I would instance village children and Cats. On the Surrey hills I have absolute knowledge of the eggs of Blackbirds, Thrushes, and other birds having been cooked and eaten when a *successful* day's collecting has been accomplished, such as the acquisition of more than fifty eggs by one boy alone. During two seasons, among the many nests constructed in my garden at Warlingham, not a single brood was reared. A lady in my immediate neighbourhood possessed three "magnificent" Cats, as I heard them described. These brutes were pampered by day, and always turned out at night. All my garden nests were rifled when the young were nearly fledged. One of these furies I privately buried; the other two escaped many dangers. These Cats were practically bird-eaters.—ED.]

NOTICES OF NEW BOOKS.

A Handbook of British Birds, showing the Distribution of the Resident and Migratory Species in the British Islands, &c.
By J. E. HARTING, F.L.S., F.Z.S. John C. Nimmo.

THIS is really a commentary on the history of British Birds; it is rather a notebook than a handbook; it expresses the author's mature opinion, and gives a reference to much of the information on which it is based; it is not apparently designed as an only book on the subject, but as an indispensable one among others. In classification Mr. Harting remains with the older writers, and commences with the Accipitres,—a matter needing little comment, as the book is outside the discussion of an evolutionary principle on that subject, and is devoted to the status of what may be considered really British Birds, and facts relating to their history.

Mr. Harting, as the late Editor of this Journal, is well acquainted with, and has largely quoted from its pages, most of the records having already passed through his hands. And here the difficulties of his authorship must have been accentuated. The responsibility of sifting such records, accepting some as beyond doubt, and rejecting others as of a more uncertain character, is considerable. The sceptre requires to be held with judicial tenacity, and kept from the grasp of caprice, whilst the sorrowful reflection cannot be avoided that some of the best observations are made by those who absolutely loathe publication, and whose knowledge thus remains of a purely personal character. The author has shown considerable indulgence in recording reports of British occurrences of the Great Black Woodpecker; these reports occupy three pages, and are subsequently said to be held by Prof. Newton, on the authority of Mr. J. H. Gurney's criticism in Dresser's 'Birds of Europe,' as almost worthless in nearly every instance.

There are many notes of an antiquarian character which give a particular interest to the volume; on entries found in the

'Durham Household Book,' 1530-34, Mr. Harting proposes to change the name of Dunlin to Dunling. The weights of many birds are also given, information not always easily procurable. Our own idea is to have this work interleaved and bound up in two volumes, and used not only as a reference book for British birds—which it undoubtedly is—but to make it an even greater storehouse by the addition of our gleanings and memoranda. A well annotated volume is always a compliment to the book itself.

The coloured illustrations, reproduced from original drawings by the late Prof. Schlegel, represent the heads of two hundred and sixty-two species (male and female), and will no doubt prove a boon to many observers and incipient ornithologists.

The Life and Letters of Gilbert White of Selborne. By his Great-grand-nephew, RASHLEIGH HOLT-WHITE. John Murray.

It is a coincidence that two English classics—and yet how diverse!—appeared almost simultaneously: we allude to the 'Decline and Fall of the Roman Empire,' and the 'Natural History of Selborne.' The writer of this interesting book has avoided the mention of this literary twinship. White was born in 1720, and died in 1793; Gibbon's birth took place in 1737, and his death in 1794. The 'Natural History of Selborne' was published in 1788, the same year as Gibbon's concluding volumes were given to the world. With the almost certainty that both books will last with the language, and that they have nothing in common, the parallel may be considered closed.

We have had so many editions of the work, that the life of its writer was almost a demand of letters. These two volumes lift much of the veil, and probably tell us all we shall ever know on the subject. We can see that Gilbert White was a genius in the sense of the not universally accepted definition, that that much-used word is the equivalent of the art of taking pains. He was an ardent naturalist—born to that vocation—a man of thrift, an old-time clergyman of the Established Church, a courteous gentleman, and one who certainly did not excel in the gentle art of making enemies. Besides this, he ever studied the method of dignified composition, a circumstance, almost as much as its natural history, which has rendered his book a classic.

This long placid life of continuous observation and industrious notation, passed in what has been irreverently called "single blessedness," and apparently without either romance or affliction, was a congenial atmosphere for the production of this little masterpiece. We have now and then a glimpse of the dull conformity of the inhabitants. "For more than a century past," White reports to his Bishop, "there does not appear to have been one Papist, or any Protestant Dissenter of any denomination." We also read, "Selborne is not able to maintain a schoolmaster," Our naturalist also abhorred the "dangerous doctrines of levellers and republicans"; he writes, "I was born and bred a gentleman, and hope I shall be allowed to die such"; while he explains to a correspondent, that "the reason you have so many bad neighbours is your nearness to a great factious manufacturing town." He was as lovable as a Vicar of Wakefield, but not so foolish; he seems to have been really outside politics; and we are told nothing as to his theological views. He was probably a model village priest, and a true friend to his parishioners.

This completes our purview of these two charming volumes, which must find a place with all Selbornian literature. They give us the life of the author of the book we have so often read. The portrait given as frontispiece is probably apocryphal, as we are distinctly told elsewhere that "no portrait or sketch of any kind was ever made of him."

The Birds of Siberia: a Record of a Naturalist's Visits to the Valleys of the Petchora and Yenesei. By HENRY SEEBOHM, F.L.S., &c. John Murray.

OF all books of travel, those written by naturalists for the perusal of naturalists are perhaps the most charming. The cabinet ornithologist can in fancy see his dried skins as living birds, and experience the difference between these creatures in their native haunts, and their mummified remains in cabinet drawers. This book is a revised and amalgamated form of two previous publications by Mr. Seebohm, strangely entitled 'Siberia in Europe,' and 'Siberia in Asia,' both previously noticed at the time of their publication in these pages; and, like "Japhet in search of a Father," this most interesting volume is still in want of a consistent title, the 'Birds of Siberia' being, strictly, a misnomer.

A definite object was before these two expeditions—the first of which may be said to have owed its initiative to Mr. J. A. Harvie-Brown—and that object was the acquirement, if not even the discovery, of the eggs of the Grey Plover, the Little Stint, the Sanderling, the Curlew Sandpiper, the Knot, and Bewick's Swan. Of these the Knot was the only species unseen, and of the others, identified eggs were obtained and brought home of the Grey Plover, the Little Stint, and Bewick's Swan. But this has been pointed out before; the importance of the present publication is that it combines two volumes which had very much in common, and that it places a charming account of ornithological exploration in a revised and handsome form, and at a reasonable price, at the option of ornithologists, as well as of those who would read a vivid account of the immense contrasts which nature exhibits between her winter and summer solstices in those northern regions.

The Mammals of South Africa. By W. L. SCLATER, M.A., F.Z.S.
Vol. II. Rodentia, Chiroptera, Insectivora, Cetacea, and Edentata. R. H. Porter.

THE first volume of this monograph has been already noticed (*ante*, p. 77); the second has now appeared, and concludes a section of an important faunistic publication. There are probably many more of the smaller mammals to be discovered in South Africa, but Mr. Sclater has now brought our knowledge up to date, and with these two volumes the naturalist should have little hesitation in the identification of his species. In fact, the scientific or technical description is completed so far as present collections are concerned; other species will be doubtless discovered and described; but the great, or natural history work still requires to be done, and that may well claim the attention of field naturalists for many years to come. We want now to know more of the life-histories and habits of these creatures; we are waiting for the narratives of the Gilbert Whites and Richard Jefferies of South Africa. When these men arise they will find their pursuits made very possible by the aid of these excellent volumes, which to the sportsman should prove a perfect *vade mecum*.

EDITORIAL GLEANINGS.

IN Merck's Annual Report for 1900, a publication recording that year's advances made in clinical and pharmaceutical knowledge, is an interesting contribution on strychnine nitrate, which has for a long time been employed for the destruction of animals or birds of prey, and when applied internally has generally acted as a rather rapid and certain poison. Complaints have, however, been made for a number of years to the effect that at times strychnine has shown itself ineffective, especially with large animals, which has induced the writer to enquire into the causes of this phenomenon. Strychnine and its salts—in particular its nitrate—which is commonly used for poisoning purposes, are, chemically, very stable compounds, and their toxic efficacy remains unchanged for years. Its occasional inefficiency can therefore have its cause exclusively in the mode of administration, the state of the body, especially the extent to which the stomach is charged, and the presence or absence of the tendency to vomit. From Feser's experiments* it appears that strychnine nitrate may be administered internally to Dogs in the solid form without detriment to the degree and promptness of its action. This mode of administration, which gamekeepers and sportsmen are compelled to adopt, has, in six experiments of Feser, invariably resulted in the animals' death, whereas they recovered if the same dose was given in the form of a solution. Feser ascribes this result to the rapid solubility of the strychnia salt in the stomach of Dogs, and the more rapid absorption of the concentrated salt solution.

It is of the utmost importance that the poison should be correctly dosed. According to Kobert† the lethal dose of strychnia administered subcutaneously amounts to 0·75 mgrm. ($\frac{1}{90}$ gr.) per kilo ($2\frac{1}{5}$ lb.) in the case of Dogs. Feser fixes, however, 0·5 mgrm. ($\frac{1}{20}$ gr.) per kilo ($2\frac{1}{5}$ lb.) as the subcutaneous dose of strychnia nitrate which kills a Dog with certainty, whilst 1 mgrm. ($\frac{1}{64}$ gr.) per kilo ($2\frac{1}{5}$ lb.) produces the same result with certainty if given internally. According to Fröhner,‡ the minimum lethal dose is for Cattle 0·3–0·4 grm. (5–6 gr.), Horses 0·2–0·3 grm. (3 to 5 gr.), Pigs, 0·05 grm. ($\frac{3}{4}$ gr.), Dogs 0·005–0·02 grm. ($\frac{1}{200}$ to $\frac{1}{50}$ gr.), Cats 0·002–0·005 grm. ($\frac{1}{32}$ to $\frac{1}{12}$ gr.). Unfortunately, data have hitherto been lacking

* 'Archiv f. wissenschaftl. u. prakt. Thierheilk.' 1881, vol. vii. p. 77.

† 'Lehrbuch der Intoxicationen,' p. 664.

‡ 'Lehrbuch d. Toxikologie f. Thierärzte.' ed. ii. 1901, p. 178.

respecting the weight of different animals. Enquiries were therefore addressed to one of the leading experts on this subject, Mr. Carl Hagenbeck, of Hamburg, by whose courtesy the following data were contributed. The average weight of adult individuals of the subjoined species and varieties of animals is as follows :—

Lions (male)	150–180 kilo	(330 to 396 lb.)
(Female Lions are somewhat less in weight.)		
Tigers, Indian and Siberian.....	100–150	„ (220 to 330 lb.)
Bears, Asiatic, <i>e.g.</i> Thibet Bears	80–120	„ (166 to 264 lb.)
Bears, Russian and Caucasian...	100–170	„ (220 to 374 lb.)
Bears, American (Grizzly)	150–225	„ (330 to 495 lb.)
Wolves, Russian and American	30–55	„ (66 to 121 lb.)
Foxes, European	5–8	„ (11 to 17 lb.)

According to these data the certain lethal doses for the internal application of strychnia nitrate are, in round figures, as follows :—

For Lions	0·7	gram. ($10\frac{1}{2}$ gr.)
For Tigers	0·6	„ (10 gr.)
For Bears (Asiatic)	0·5	„ ($7\frac{1}{2}$ gr.)
For Bears (Russian and Caucasian)	0·7	„ ($10\frac{1}{2}$ gr.)
For Bears (American)	0·9	„ (14 gr.)
For Wolves	0·25	„ (4 gr.)
For Foxes	0·035	„ ($\frac{1}{3}$ gr.)

The lethal doses suitable for birds of prey may be calculated from a table which I. Schneider* has recently compiled for a few domesticated birds. According to this table the internal lethal doses per kilo ($2\frac{1}{5}$ lb.) are as follows :—

For Geese	2·3–3·0 mgr.	($\frac{1}{25}$ to $\frac{1}{20}$ gr.) of strychniæ nitras.
For Ducks.....	3·0–4·5 mgr.	($\frac{1}{20}$ to $\frac{1}{15}$ gr.)
For Fowls (which exhibit a remarkable capacity for resisting the action of the poison)	30–140 mgr.	($\frac{1}{2}$ to $2\frac{1}{8}$ gr.)
For Pigeons	8·5–11·0 mgr.	($\frac{1}{8}$ to $\frac{1}{6}$ gr.)

The corresponding experiments showed that it was immaterial both with regard to the intensity of the action and the time required for the fatal issue whether the preparation was given as an aqueous solution, or whether the birds were fed with strychnia wheat.

In the general interest it may be mentioned that, as pointed out by

* ‘Monatsschr. f. prakt. Thierheilk.,’ by Fröhner and Kitt., vol. xi. No. 6, p. 245.

Fröhner, Knudsen,* and I. Schneider,† the flesh of animals killed by strychnia poisoning may be consumed without fear of poisoning after being freed from the entrails, and prepared in the proper manner.

JARROLD & SONS, of Warwick Lane, E.C., invite subscriptions to a proposed volume—‘Letters and Notes on the Natural History of Norfolk, more especially on the Birds and Fishes, from the MSS. of Sir Thomas Browne, M.D. (1605–82). With Notes by Thomas Southwell, F.Z.S., M.B.O.U.’ We understand that the appearance of this book is dependent on a certain measure of promised support.

IN the ‘Transactions’ of the Natural History Society of Glasgow, vol. vi. pt. 1, Mr. Hugh Boyd Watt has contributed “A Census of Glasgow Rookeries,” compiled in the season of 1900. The following is a summary of results:—Eight Rookeries inside the city (Dalmarnock, Belvidere, Langside, Camphill, Crosshill, Ibroxhill, Bellahouston, and Botanic Gardens) contain 384 nests; and the other Rookeries of which details are given (say) 911 nests = 1295 in all. Add to this 10 per cent. for omissions and oversights (Mr. Watt’s experience is that he under-estimates the numbers of birds, generally speaking), making a total of 1425 nests. This represents 2850 parent birds, and, assuming that each nest sends out into the world two young birds, there are a further 2850, making the native Rook population of the outskirts of Glasgow last summer amount to 5700 birds.

MR. ALFRED J. NORTH has drawn attention to the importation of foreign mammals in New South Wales as an indirect factor in the destruction of a vast number of Australian Birds (‘Records, Australian Museum,’ vol. iv. p. 19). The phosphorized oats used as poisoned baits for decreasing the number of Rabbits has also caused the annual destruction of thousands of graminivorous birds, “chiefly the ground- and grass-frequenting species of Pigeons, Parakeets, Finches, and Quail.” To cope with the Rabbits, domestic Cats were also turned loose, with the result that, after the Rabbits had been eradicated or disappeared, the felines—now become wild and of increased size—turned their attention to the ground- and low-bush frequenting birds, destroying large numbers of many species, and causing the total extinction of others where they were once common. The Fox, described as “that acclimatised curse” in Victoria, is not only robbing poultry-yards, but destroying numbers of most interesting species of the Victorian avifauna. In the lair of one of these animals the remains of upwards of thirty tails of Queen Victoria’s Lyre-bird were found, mostly those of female and presumably sitting birds.

* ‘Monatssh. f. prakt. Thierheilk.,’ vol. i. p. 529, vol. ii. p. 374.

† Ibid. vol. xi. p. 269.

CERTAIN markings sometimes found on the Dolphin (*Grampus griseus*) are now generally accepted as the traces of encounters between these animals and large Cuttle-fishes. These markings are well figured in Flower's paper in the Trans. Zool. Soc. (vol. viii. pl. 1), and the suggestion was first made by Capt. Chaves, of Ponta Delgada.* Prof. D'Arcy W. Thompson, in the last issue of the Ann. and Mag. Nat. Hist., has drawn attention to an older illustration of a Dolphin on which a great Cuttle-fish has left his unmistakable marks. The figure referred to is that on pl. xxviii. (Mammifères), fig. 2, of the 'Voyage de l'Astrolabe,' and represents the lower surface of the head of *Delphinus novæ-zelandiæ*, Q. et G. The writer remarks:—"A glance at the figure will show that the so-called pores are the clear impressions of the suckers of a Cuttle-fish. The Dolphin itself was 5 feet 10 inches long, and we may judge from the figures that the sucker-rings were about, or very nearly, an inch in diameter. We may, perhaps, go a little further, and surmise that while these impressions were left by the suckers, the patches of 'striæ' were produced by tentacular hooks—in short, that the Cuttle-fish which made both was a giant *Onychoteuthis*."

IN the 'Athenæum' for June 1st, Mr. James Platt, Jun., has communicated an interesting letter on the Brazilian names of Monkeys.

"There is an interesting little group of five native names of South American Monkeys—*saguin*, *sapajou*, *sai*, *saimiri*, *sajou*—of which the 'Century Dictionary' remarks that they are 'now become inextricably confounded by the different usages of authors, if, indeed, they had originally specific meanings.' The 'Century' vouchsafes practically no etymology of these zoological terms. They all belong to the Tupi language of Brazil. *Sai* is the word for Monkey. *Sai-miri* is its diminutive, from *miri*, meaning little. *Sajou*, on the contrary, is a French contraction for *sajouassou*, as Buffon spells it, or *sai-uassu*, as it should be written, where the termination *-uassu* is augmentative. We thus arrive at three shades of meaning to begin with. Research among old French works of travel would have thrown further light on the distinction between these terms in the sixteenth and seventeenth centuries. Jean de Lery, 1580, carefully separates *çay*, Gueon, from *sagouin*, Marmot. A still better authority is Claude d'Abbeville, whose 'Mission en Maragnan,' 1614, pp. 252-3, adduces all five names, in his orthography *sagouy*, *sapaïou*, *çayou*, *çaymiry*, *çayouassou*. The last he defines as 'grande monne ou grande gueon.' *Sapaïou*, according to him, really is a synonym for *çaymiry*.

"A sixth hitherto unexplained word for a kind of Monkey is *ouarine*,

* In Girard's "Céphalopodes des îles Açores," Journ. Sc. math. phys. e natur. Lisboa (2), 11 1892.

which occurs in several English dictionaries, such as Webster and Ogilvie, as French. Some naturalists anglicize it as *warine*, e. g. Goldsmith. Littré has it with a reference to Buffon, but without derivation, which is not surprising, as it is a 'ghost-word,' a misreading or typographical error for *ouariue*. The correct *ouariue* will be found in the book I have just quoted, p. 252. In modern French spelling it should, of course, be *ouarive*, which is then seen to be merely a French disguise for the well-known *guariba*, of which a good account is given by Mr. Bradley in the 'N.E.D.' Similarly, the Brazilian *maniba*, the stalk of manioc, is called *manive* by the old French voyagers, e. g. by Bellin, 'Description de la Guiane,' 1763, p. 56."

MICE, as is generally known, will devour lepidopterous pupæ, but that they will also indulge in larvæ is the subject of a communication by Mr. Carleton Rea to the last issue of 'Science Gossip.' The curator of the Hastings Museum, Victoria Institute, Worcester, had secured last May over fifty larvæ of the large Emerald Moth (*Geometra papilionaria*). These he intended to "sleeve out" on growing trees, but delayed doing so, with the result that a Mouse or Mice broke into his collection, and destroyed the greater part of the larvæ.

THE 'ENTOMOLOGIST' has recently reprinted the Address delivered to the Lancashire and Cheshire Entomological Society on Jan. 14th last by Mr. E. J. Burgess Sopp. In it allusion is made to the ever decreasing area of our forest land in this country, with special reference to Delamere Forest. We read that, "on the authority of Mr. Fortescue Horner, one of H.M. present Commissioners for Woods, Forests, and Land Revenues, that five and forty years ago the woodlands of Delamere extended to nearly 4000 acres, since which time 1800 have been cleared for agriculture, and 126 sold. At that period 750 acres of reclaimed land were already let out as farms, a total which at the present day has grown to 2550: so that from 1856 to the end of the century just closed the woodlands appear to have shrunk from nearly 4000 acres to but little more than half their former dimensions." This is a matter to be pondered over by all British naturalists.

DR. A. W. ALCOCK has placed us all under an obligation by printing, as a separate memoir, "Zoological Gleanings from the Royal Indian Marine Survey Ship 'Investigator.'"* As the author remarks in an introduction, "so many of the biological observations made through the medium of the 'Investigator' are buried in reports that are not accessible, and so

* Simla, 1901.

many are scattered through 'systematic' papers where they are easily overlooked, that I have thought it advisable to collect and classify, as a supplement to the 'Summary of the Deep-Sea Zoological Works' published in these memoirs in 1899, all such observations as have been recorded since I first became connected with the ship, together with many hitherto unpublished facts selected from my Journal." The branches of zoological knowledge to which contributions are made are—"Illustrations of Commensalism"; Notes on Sexual Characters; Pairing and Viviparity among Marine Animals, and on the sounds made by certain of them; Notes on Stalk-eyed Crustacea; Instances of Protective and Warning Colouration: the Phosphorescence of certain Marine Invertebrates; Peculiarities of Food, &c. We wish that this condensation was made by authors from other publications; biological facts do remain very often buried except to the most industrious students, and even then their knowledge is necessarily of a personal equation.

MESSRS. FRIEDLÄNDER & SOHN, of Carlstrasse II, Berlin, have just brought out a new and revised edition of their 'Zoologisches Adressbuch.' Mention has been already made in these pages as to the usefulness to all naturalists of this universal directory, and in its present revised form it will be still more serviceable. We still prefer, however, the usual and general method of allowing naturalists to communicate their own proper addresses, for we notice that the zeal of the compiler for change has in some cases outrun his discretion. However, all naturalists who have reason to correspond with others—and who has not?—will appreciate this publication.

WE have received the Report for the year 1900 of the Ghizeh Zoological Gardens, near Cairo, written by the Director, Capt. Stanley S. Flower. The following animals were born in the Gardens and successfully reared during 1900:—

- Two Black Lemurs (*Lemur macaco*).
- Two Mongoose Lemurs (*L. mongoz*).
- Seven Dorcas Gazelles (*Gazella dorcas*).
- Three Angora Goats (*Capra hircus*).
- One (Three-quarter bred) Ibex (*C. nubiana*).
- Two Hedjaz Sheep (*Ovis aries steatopyga*).
- Three Guinea Pigs (*Cavia porcellus*).
- Three Turtle Doves (*Turtur senegalensis*).
- Nine Laughing Doves (*T. risorius*).



West, Newman imp.

The Squirrel.
Sciurus vulgaris.

THE ZOOLOGIST

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NOTES ON THE *SCIURIDÆ*.

By J. L. BONHOTE, M.A., F.Z.S.

(PLATE I.)

IN a civilized and thickly populated country, the first of the wild native fauna to fall before the superior advance of man are the larger mammals; and, although in many cases man has been the loser by the wantonness of his slaughter, yet as a rule, such destruction having been for the general benefit of the human race, one has perforce to lay aside one's sentimental desires and accept the inevitable. Among the smaller mammals, however, no such tale of slaughter exists, and Rats and Mice maintain their existence under the very roofs of man, who is practically powerless to diminish their numbers. That the abundance of these latter is in part due to the scarcity of the larger mammals is to a great extent true; but as my object is not to discuss the protection or otherwise of mammals, let us turn to the one group which does comparatively little harm, and to the species which, although of diurnal and conspicuous habits, still remains in numbers to enliven our woods and forests—the Squirrel (*Sciurus vulgaris*).

The Squirrel, as most people know, is a rodent of arboreal habits; in shape and size it much resembles a Rat, but its feet are longer and more plastic, enabling it to grasp with greater ease the trees on which it lives. The front feet have only four

toes, the thumb being a mere stump, which is much used for holding the nuts while they are being cracked. The tail, which is large and bushy, serves the double purpose of balancing the body whilst leaping through the air, keeping it dry by being folded over its back, and enabling the animal to keep warm when curled around it.

Squirrels are widely dispersed throughout the world, being absent alone from Australia and Madagascar. In the Palæarctic Region, which stretches from England to Japan, only one species is known, although individuals from various localities are constant to themselves, and slightly different from their neighbours. It is, however, in the Indian and Oriental region that the species reaches its maximum development, and the number of species recorded from that region is very large. Putting aside for the moment the question of species, subspecies, races, varieties, &c., and looking as far as possible at the groups as a whole, we find that they give us such abundant opportunities for the study of colour in nature, and the causes by which it is influenced, that they can but form a valuable lesson to the zoologist, whatever may be his particular line.

I will preface my remarks by saying at the outset that our knowledge on the subject is very limited, and that at present we are in the position of only recording facts, which, however, may at some future time bear considerable fruit. In the first place, there is the colour of the animals, which, in the case of our English Squirrel, may be roughly called red.* This colour is modified during the course of the year† by two moults, in spring and autumn, the change taking place in May and October. In its winter dress it is greyish brown in colour, the hairs being long and soft, the tail is of a similar colour, and the ears are also clothed with long brown hairs; in May all the body-hairs are cast, and are replaced by shorter and coarser hairs of a much redder colour, while the tufts on the ears are not replaced. The hairs of the tail are not moulted at the spring moult. This may seem to be only the natural course of things to an ornithologist, but a moment's thought will at once show us that the causes

* For actual descriptions of various European forms, see G. E. H. Barrett-Hamilton, P. Z. S., 1899, p. 3.

† See O. Thomas, Zool. 1896, p. 401.

must be very different. The tail as a balancer must be as much required in summer as in winter, if not more so; but, on the other hand, the tail as a warm covering is not so necessary, and hence probably the reason of its not being renewed. There is, however, a further noticeable point about this tail, which is fully dealt with by Mr. Thomas in the article quoted above, and that is, that as it gets older it becomes lighter in colour, till by autumn it is nearly white. Mr. Thomas further points out that the red hairs of summer show no tendency to this bleaching process, whilst the brown winter hairs slowly bleach throughout the time they are worn, but, being replaced in spring, the process is never so conspicuous on the body as on the tail, where the change goes on throughout the year.

Although we are accustomed to see fur and feathers of all kinds "bleach" under the action of light, we are perhaps too much inclined to take it for granted that the bleaching action on a living animal goes on by the same process. This may be true of a bird's feather, which is considered histologically dead, yet it is hardly conceivable in a mammalian hair, which maintains throughout its life an active connection with the body; and, bearing this in mind, one may notice that the bleaching, which, if the tail were dead, one would expect to go on uniformly, starts at the tip, and gradually spreads downwards towards its base, thereby, to my mind, clearly showing that, although this lightening may, and probably does, take place by a merely mechanical process, yet such a process cannot act on the normal living hair. I may be perhaps allowed to mention on this matter, that when bleaching goes on among birds that bleaching process does not begin and continue slowly throughout the life of any particular feather, but a feather which may show hardly any change during the first six months of its life will suddenly undergo considerable disintegration and bleaching on the seventh. Does it not seem as though vital forces existed in that feather during the earlier part of its life? Taking our remarks on bleaching into a rather wider field, we find that this "fading" is restricted either to certain races, or to certain parts of the animals—for instance, among the large and closely allied Squirrels of the *Ratufa bicolor* group, as I have already shown in a previous paper,* which inhabit the

* Ann. and Mag. Nat. Hist. ser. vii. vol. v. p. 490 (1900).

Malay Peninsula and Borneo. This bleaching is entirely absent in a large form (*R. gigantea*), while being present and a very conspicuous feature in the very closely allied form (*R. bicolor*), although chiefly confined to the body.

In *R. affinis* (another species) it is general and uniform both on the body and the limbs, and in *R. ephippium* is almost entirely absent, or, if present, confined, as in the case of the European Squirrel, to the tail only.

To account for changes of this kind as being due merely to the bleaching or wearing of the hairs seems to me hardly a sufficient explanation, for if that were the sole cause there would be no reason why one portion of the animal should bleach more than another. It might be accounted for in some cases, as Mr. Thomas has pointed out in our European Squirrel, by the absence of a moult; but such a solution would hardly hold good in the case of *R. bicolor*, where the line of demarcation is irregular, and varies in individuals; or again, in the case of *R. affinis*, where the bleaching, which is general, follows so quickly on the growth of the new pelage that hardly any specimens in unbleached pelage are known in our museums.

It seems to me that the only way to account for these phenomena is to suppose that these hairs must sever their physiological connection with the body, and that, when disconnected, the destructive action of light and weather is able to act; but to thoroughly elucidate this matter microscopical examination of fresh specimens is necessary. My object in this paper is merely to draw attention to the facts.

Apart from this seasonal change by bleaching, there are two other forms of seasonal pelages to be observed. The one, which may be noticed on *S. berdinoni*, and doubtless many other forms, in which the pelage worn in summer is a much brighter and more intense edition of that worn during the colder portions of the year. Whether the change takes place by abrasion or by moult, I am unable to say—possibly the former, as the dark lateral stripes can be clearly distinguished in the winter pelage, but very much concealed owing to each hair having a dark brown tip. The other seasonal pelage is that in which the brightest phase takes place in winter, and, instead of being a brighter edition of the duller pelage, is markedly distinct. The only two

examples of this pelage with which I am acquainted are *Sciurus caniceps* and *S. atrodorsalis*. During the greater part of the year these forms wear a dull grey dress, but in the winter months (from December to February) both sexes assume on the back, by moult, a much more brilliant pelage, which in the case of the former is deep orange, and in the case of the latter a glossy black. It is supposed that the assumption of this dress coincides with the pairing season, but I am not aware that this has been actually proved.

Let us now turn again to our European Squirrel. Many depredations on young trees and birds are laid to his account, and I fear it must be acknowledged these accusations are to some extent true. He is in the main, however, a vegetable feeder, living chiefly on beech-mast and acorns, but little in the way of seeds comes amiss to him; and when in the fir-woods the cones are found very much gnawed by his strong and sharp teeth. With one I had in captivity, whose chief food used to be hazel-nuts, the method of eating them was always the same. The nut would be held by the large end, so that the long axis of the narrow portion was transverse to the mouth, when an incision would be made until there was a hole large enough for the insertion of the incisors between the shell and kernel. Into this hole the lower incisors would be placed, and a piece of the shell broken off by a sharp twist of the head; similar actions would be repeated until the whole of the shell was broken off, and then the kernel would be devoured.

Although, as I have said, their food is chiefly, if not entirely, vegetable, my tame one would frequently use his teeth on the furniture, boots, or anything handy, apparently from mere wanton destruction, and when offered fresh twigs with any bark on would invariably strip them of the bark, although it did not appear to be eaten.

In England pairing takes place early in April, and the young are born about midsummer in large nests or "dreys," composed of sticks, on which is collected a large mass of moss neatly hollowed out inside, the opening lying to the side. Several of these "dreys" are said to be built by each pair, and if the young be discovered they are moved as soon as possible to another nest. The male Squirrel remains with the female most

of the summer, and in the autumn family parties may still be seen together.

To see a party of Squirrels at play is a sight which no one can fail to appreciate; their actions are so full of life and activity, running up one tree, jumping to the next, sliding to the ground, a few yards run and up another tree, evidently in full enjoyment of their own powers and activity. Such a sight is still to be seen in any of our woods, and it is still to be hoped may long remain so, safe from the weapons of the casual loafer, or still more dangerous keeper.

ORNITHOLOGICAL NOTES FROM SURREY.

BY JOHN A. BUCKNILL, M.A.

SINCE the publication, in the summer of 1900, of 'The Birds of Surrey,' I have, as I felt sure would be the case, had my attention drawn to a considerable quantity of interesting matter which had either escaped my notice or had not been previously communicated to me. Several fresh correspondents have also favoured me with their personal observations. These accumulated notes have assumed such proportions that I have decided to publish them in the form of a connected paper.

The Editor of this Journal has kindly informed me of a small book, published in 1856, entitled 'A New Flora of the Neighbourhood of Reigate, Surrey,' by James Alexander Brewer, F.L.S. This publication, although dealing almost entirely with botanical observations, contains as an appendix an interesting list of local birds compiled by two gentlemen, Messrs. William H. Tugwell and Charles Andrews. As, however, it condescends to no detail of any sort whatever, but is merely a bare catalogue of names, and as it does not include any species new to my already published list, I do not intend to set it out or remark upon it at any great length. It enumerates one hundred and fifteen species, amongst which are to be found the following names:—Merlin, Kite, Buzzard (Common), Hen-Harrier, Short-eared Owl, Great Grey Shrike, Grasshopper Warbler, Wood-Wren, White Wagtail, Grey Wagtail, Wood-Lark, Cirl Bunting, Brambling, Mealy Redpole, Crossbill, Chough, Raven, Hoopoe, Quail, Bittern, Bean Goose, Hooper, Pintail Duck, and Wigeon.

These are the chief names of interest; perhaps the most useful is that of the Kite, which in Surrey has scarcely any record.

The White Wagtail has attached to its name an asterisk, but no indication is given as to the meaning of it. Although the correct Latin name, *M. alba*, is given as well, it is curious to

note that *M. raii* (the Yellow Wagtail) is not included in the list, especially as it has been recorded from the Reigate neighbourhood with some frequency by other observers. This somewhat inclines me to wonder if the species is really intended to be included as such.

The Chough is a curious addition to the list. It has been obtained on only five occasions in the county as far as I am aware, and it is perhaps more than probable that all these specimens were mere "escapes."

The Bean Goose and the Hooper are interesting species from a local point of view. The former has been recorded specifically from Surrey but once, though noticed in general terms by "A Son of the Marshes" in his local works; the latter, together with the Pintail, may have occurred on some such water in the Reigate district as Gatton Lake, from which a good many of the rarer ducks have been occasionally recorded. I do not think that any of the other species enumerated need any particular comment. Taken as a whole, the list may be regarded as interesting and valuable, although it is not now possible to test its accuracy, and it is a matter of much regret that details, at any rate of the rarer species enumerated, were not given.

It is obviously incomplete, and compared with the one hundred and ninety-five species recorded by "Rusticus" in 1849 from the Godalming district, is of quite second-rate importance. Perhaps the most striking omissions are the Ring-Ouzel, Yellow Wagtail, Dartford Warbler, and Long-eared Owl.

Another publication, which was brought to my notice in the pages of this Journal, is a work by Alfred Smee, F.R.S., entitled 'My Garden.' This is a large work—it was published in 1872—and deals very fully with all forms of life in the author's pleasure-grounds at Carshalton.

In an interesting chapter on birds, Mr. Smee records ninety-six visitors to his grounds, some of which are quite valuable. Mr. Smee mentions one occurrence of the Hooper on his lake during severe weather in winter, and in this connection it is worthy of note that this species was recorded from the Wandle near Carshalton in the winter of 1860-1 by Mr. S. Gurney (*vide* Zool. 1861, p. 7386). Mr. Smee also records from his lake the Wild Duck, Teal, Wigeon, and Tufted Duck, besides the female

Smew from Wallington, recorded by Mr. A. H. Smee in the 'Zoologist,' 1871, p. 2487, and the Slavonian Grebe, recorded by the same gentleman in the 'Zoologist,' 1870, p. 2106.

Amongst other of the more interesting species, Mr. Smee notices the Water-Rail, the Jack Snipe, the Common and the Green Sandpiper, the Quail, Hooded Crow, Magpie, Wood-Lark, Grey Wagtail, Grasshopper-Warbler, and the overhead passage of Geese, Whimbrels, and Curlews.

He also says:—"A bird supposed to be a Crane (*Grus cinerea*) appeared in the park every evening for fifteen or sixteen days in Feb. 1871, but it was never absolutely authenticated" (p. 530).

This is a pity, as it would have added another name to the county list. Mr. Smee also speaks of the Rock Dove, though only in a quasi-feral state. On the whole, this publication may be regarded as distinctly useful.

A recent publication, entitled 'Farnham and its Surroundings,' by Gordon Home (London, 1900), contains a chapter upon the Birds and Reptiles of the neighbourhood, compiled by Mr. Bryan Hook; but, although it is a good list of birds which is given, it is unnecessary for me to dwell upon it, as Mr. Hook favoured me with his personal notes in the preparation of my book. I think all the rarer species mentioned by him in this list have been referred to in my text.

I have also, through the kindness of my deeply lamented friend, Mr. Philip Crowley, of Waddon, had the opportunity of making a very close examination of his magnificent collection of eggs, which is very rich in "clutches" of rare Surrey birds, mostly taken in the 'sixties near Farnham, when Mr. Crowley was then at Alton. In those days there must have been a wealth of bird-life on those western moors of quite an astonishing character, as Mr. Crowley's cabinets show.

I have been very carefully through the Epsom College Natural History Club Reports, and have also been favoured with a copy of the Proceedings and Lists of the Wellington College Natural Science Society. Both these journals contain extremely useful information.

The following are the chief notes of importance which I have received since publication.

RING-OUZEL (*T. torquatus*).—One seen, Reigate Hill, in the autumn of 1899 (C. E. Salmon, *in lit.*).

DARTFORD WARBLER (*S. undata*).—Has been noticed near Bagshot prior to 1900 by Mr. F. B. P. Long (*in lit.*). Mr. Crowley told me that his collectors in the Churt district in the 'sixties sent him some sixty or seventy clutches (including two with Cuckoo), all taken in that district. After 1869 a very large forest fire destroyed the tract of furze-covered heath where the bird had been so common. A large number of birds were shot by collectors. Mr. Crowley's collection contained a splendid series of nests and eggs—some forty clutches; the remainder of those he received having been exchanged or given away.

I find also that Mr. J. D. Salmon in his egg collection (now in the possession of the Linnean Society) had a clutch taken in June, 1860, near Frensham, which were sent to him by Mr. James Lewcock (MS. catalogue). It is hardly a matter of wonder that this species has become so rare in Surrey in view of the wholesale destruction with which it appears to have been pursued about this period, but it is evident that it was then extremely abundant in that neighbourhood.

Mr. J. H. Gurney informs me that he considers it extinct on both Walton and Reigate heaths (*in lit.*).

CHOUGH (*P. graculus*).—I am informed by Mr. H. B. P. Long that a bird of this species escaped from captivity at Windlesham about the same time as the specimen which I have recorded as being killed near Effingham in 1894 was shot. As the escaped bird had lost one leg owing to an accident whilst in captivity, and also had a malformed beak, there is no doubt that the Effingham specimen (which presented both these peculiarities) must be now regarded as a mere "escape."

RAVEN (*C. corax*).—Mr. Crowley had observed this bird at Churt, and had an egg from there in 1862. This egg he considered undoubtedly belonging to this species. In the summer of 1896 one was observed at Stoke-d'Abernon by the Rev. T. N. Hart-Smith, of Epsom.

LESSER REDPOLL (*A. rufescens*).—A nest and eggs were taken on May 20th, 1894, near Epsom (Epsom College Reports).

TWITE or MOUNTAIN LINNET (*A. flavirostris*).—Mr. Felton has shown me some eggs taken by himself on June 24th, 1894,

at Weybridge. Although Mr. Felton did not indubitably identify the bird, the eggs are certainly indistinguishable from the Twite's. They will, however, have to be adjudicated upon by the British Ornithologists' Union before any definite statement can be made as to their authenticity.

CROSSBILL (*L. curvirostra*).—A large number near Reigate in the winter 1899–1900 (C. E. Salmon, *in lit.*). Doubtless nests sometimes in the Bagshot district, where it has been seen late in April (F. B. P. Long, *in lit.*); and it also no doubt nests at Witley (H. Eastwood, *in lit.*).

CIRL BUNTING (*E. cirrus*).—Has twice nested in a garden at West Hackhurst, Abinger Hammer (L. M. Forster, *in lit.*).

WOOD-LARK (*A. arborea*).—Mr. Crowley had four clutches from Churt, taken in 1860. I have also a note of three nests near Epsom in quite recent years (Epsom College Reports).

GREAT SPOTTED WOODPECKER (*D. major*).—Mr. Crowley had two clutches from Churt, taken in 1860 and 1863. I have notes of its occurrence at Bagshot, Fetcham, and Mitcham; and of two nests last spring—in the Hurtwood and near Leith Hill respectively.

CUCKOO (*C. canorus*).—To the list of hosts which I gave as having been noticed in Surrey, I am now able to add the Black-cap (Churt, 1860, e coll. Crowley; and Lingfield, 28th June, 1895, part of lot 198 of Stevens's 10,204th sale); Greenfinch (Churt, circa 1860, two clutches, e coll. Crowley); Red-backed Shrike (Churt, June, 1863, *ib.*); Dartford Warbler (Churt, circa 1860, *ib.*); Sedge-Warbler (Carshalton, A. Smee in 'My Garden').

All Mr. Crowley's clutches mentioned above—and most of his Surrey eggs—were taken by one Alfred Smither, of Churt, whom Mr. Crowley employed as a collector, together with two other men named Piercey and Copper. Smither was a well-known character, who also supplied the London professionals with birds, nests, and eggs from the same district.

LONG-EARED OWL (*A. otus*).—Mr. J. D. Salmon had a clutch of three eggs taken on Godalming heath on May 12th, 1840 (MS. catalogue). Mr. Crowley, several clutches from Churt, taken in the 'sixties; and I omitted to state in writing my account of this species that Mr. Howard Saunders, in his 'Manual of British Birds' (1st ed. p. 284, 2nd ed. p. 294), mentions that

he knew of no less than eight broods in a long fir-plantation in Surrey being destroyed by an ignorant landowner. Mr. H. B. P. Long tells me he has often seen it in the Bagshot Woods (*in lit.*).

BITTERN (*B. stellaris*).—Mr. Crowley had a fine male killed on Jan. 17th, 1891, at Beddington corner. This was a great year for this species in Surrey.

SHOVELER (*S. clypeata*).—Mr. R. W. Webb tells me it has been seen on his pond at Milford House. This corroborates Mr. S. A. Davies's account. Mr. Webb also informs me that, as he never allows a gun to be fired on his lake, the Duck and Teal congregate there in large numbers in winter, and occasionally the rarer Ducks pay it a visit (*in lit.*). It is only about eight acres in extent.

TEAL (*Q. crecca*).—I have notes of a nest last year in the county. It is unnecessary to give the locality. Mr. Crowley had many clutches from the Churt district.

WIGEON (*M. penelope*).—Seen, though rarely, on Milford House pond (R. W. Webb, *in lit.*).

POCHARD (*F. ferina*).—The most common of the rarer Ducks on Milford House pond (R. W. Webb, *in lit.*).

TUFTED DUCK (*F. cristata*).—Often occurs on Milford House pond (G. Webb, *in lit.*).

GOLDEN-EYE (*C. glaucion*).—More than once seen on Milford House pond (R. W. Webb, *in lit.*). Mr. Bryan Hook has one from Frensham pond ('Farnham and its Surroundings,' p. 115).

BLACK GROUSE (*T. tetrix*).—It nested prior to and in the 'sixties on the moors round Frensham. Mr. Crowley had three local clutches, all still in his possession up to the time of his death. One of six eggs taken by his collector Piercey in May, 1862, at Churt; a second of six taken by the same man in the same month in the same place in the following year; and a third of nine taken at Hindhead by Smither, of Churt, in May of 1866. These are all splendid clutches, in perfect condition, and, as far as I am aware, are the only Surrey eggs in existence.

I have a note of a pair of birds shot some time ago on Frimley Ridges, which are preserved at Frimley Manor House (Rev. W. Basset, *in lit.*).

Mr. R. W. Webb, of Milford House, Godalming, about the

year 1875, obtained ten eggs from the Duke of Northumberland, and reared them all under a hen. They were all turned out on Witley Common, in order to improve the local stock, and the experiment undoubtedly did some good, but not for very long. The young birds would not answer the call of their foster-mother. The species, in Mr. Webb's opinion, is practically extinct now (1900) in the Witley district (*in lit.*).

WATER-RAIL (*R. aquaticus*). Mr. Crowley had two clutches taken by Smither at Frensham in 1866 and 1867.

MOOR-HEN (*G. chloropus*).—Mr. Crowley had a light buff specimen from near Croydon.

THICK-KNEE (*Æ. scolopax*).—Observed near Caterham last spring by the Editor of this journal (*in lit.*).

OYSTERCATCHER (*H. ostralegus*).—Mr. Bryan Hook has one from Frensham pond ('Farnham and its Surroundings,' p. 116).

GREY PHALAROPE (*P. fulicarius*).—Mr. Crowley had one picked up dead at Waddon in 1890.

WOODCOCK (*S. rusticola*).—Mr. F. B. P. Long informs me that it breeds regularly in the Bagshot woods; a few nests are found annually, and the young have been seen as early as April 1st. He has an egg taken some years ago in Bagshot Park (*in lit.*). Mr. J. D. Salmon had eggs from Godalming taken there in 1849 (MS. catalogue). Although not generally a good season for cock, fifteen were seen and nine bagged in one day not far from Chipstead in the early part of December, 1900.

SNIFE (*G. caelestis*).—Mr. Long tells me that Chobham Common was a great place for Snipe forty or fifty years ago, and a good many are still sometimes shot there (*in lit.*). Mr. Crowley had scores of clutches from near Frensham between 1862 and 1882, mostly in the 'sixties. There was a nest this spring quite close to the Frensham Pond hotel.

DUNLIN (*T. alpina*).—Mr. Bryan Hook has a specimen from Frensham pond ('Farnham and its Surroundings,' p. 115).

CURLEW (*N. arquata*).—In this Journal (1900, p. 382), a nest of the Curlew is stated to have been taken in the spring of 1896 on Chobham Common with some eggs, two of which were still in existence. As this was the only definite occurrence of the breeding of this species in the county, I have made the very closest enquiry into the record. The result has been very satis-

factory. It turns out that the nest was found in 1897, not in 1896, and contained three eggs. Two of these remained in the possession of the finder, a young man named Tice, until noticed by Mr. S. H. Le Marchant, of Chobham Place, Woking. I was able to obtain the fullest description of the birds from young Mr. Tice, and to examine the two eggs, which were, through Mr. Le Marchant's kindness, lent to me for further consideration. The documents relating to their discovery, together with the two eggs, were submitted to Professor Alfred Newton, of Cambridge, and eventually exhibited by Mr. Howard Saunders and Mr. E. Bidwell at the British Ornithologists' Union, by which body the record has been definitely accepted.

PUFFIN (*F. arctica*).—One caught in the autumn of 1900 near Reigate (C. Reeves, *in lit.*).

GREAT CRESTED GREBE (*P. cristatus*).—Nested or attempted to nest in at least three of their old haunts last year (H. Russell, *in lit.*, P. Crowley; 'Field,' April 21st, 1900).

RED-NECKED GREBE (*P. griseigena*).—The adult male which was picked up on Farthing Down in 1890 ('Birds of Surrey,' p. 346) was in "full breeding plumage," which makes the record much more interesting (J. H. Gurney, *in lit.*).

STORM-PETREL (*P. pelagica*).—Mr. Gordon Colman, of Nork Park, Banstead, has a specimen which killed itself by flying against some glass there five or six years ago.

Since writing the above, I have received a large number of most valuable notes, which I hope to publish shortly in a further paper in the 'Zoologist.'

NOTES FROM POINT CLOATES, N.W. AUSTRALIA.

BY THOMAS CARTER.

AT Mauds Landing, thirty-five miles south of here, on May 1st, 1900, the extensive salt-marsh, which is usually a dreary lifeless plain, with little growing on it but numerous samphire-bushes about eighteen inches in height, was covered with water, owing to the excessive rainfall this year—a West Australian “lake,” about three miles in length, half a mile wide, and in places three or four feet deep. Great numbers of White-headed Stilts (*Himantopus leucocephalus*) were breeding; the nests, which were mostly on the small patches of higher ground which formed islands, were merely a slight depression lined with a few samphire-twigs or roots. A few nests were built in the tops of the low bushes just above the surface of the water; these nests, naturally, were more compactly built. The eggs, four in a clutch, varied considerably in colour, some of them having the ground colour deep golden yellow, others quite green, but all with numerous and large black blotches. Fresh eggs were to be found there until Sept. 2nd, the birds having an uneasy time, as some natives visited the spot, and kept robbing the nests. On that date many young were fledged, and I also found young in down, which were difficult to detect, as they squatted flat and kept motionless. One of the islands proved a particularly rich field. It was only about fifty yards long and ten wide, but upon it were about twenty Stilts’ nests, four of Red-necked Avocets (*Recurvirostra novæ-hollandiæ*), two nests of the rare Gull-billed Tern (*Gelochelidon anglica*), one of the Red-kneed Dotterel (*Erythrogonys cinctus*), and newly-hatched young of the Red-capped Dotterel (*Ægialitis ruficapilla*). There was one egg in each of the Gull-billed Terns’ nests, though they were hardly worthy of the name of nest, the egg being laid in a slight hollow where the surrounding ground was perfectly bare. In shape they were a long oval, pointed at the small end, of a stone-grey colour, with numerous

dark brown blotches and spots, other underlying spots appearing lilac. I shot two specimens of these Terns; there were several pairs there. One bird contained a quantity of grasshoppers, the other small Lizards. The Red-kneed Dotterel's nest was snugly concealed under a tuft of samphire. The eggs (four in number) were richly marked, but just on the point of hatching. The Stilts showed much anxiety about their nests, uttering their plaintive cries, and with fluttering wings feigning lameness to entice one away. The Avocets were very shy, and kept well out of gunshot; their eggs were very similar to the Stilts', but rather larger in size. In the deepest part of the lake was a small island with thick samphire-bushes. Here a pair of Black Swans had built a nest, and had five eggs on May 2nd. On July 27th the young were about as large as a Goose. The family left about the end of September, when the water was rapidly drying.

On May 11th one of the boys, who had been to the boat to wash her down, returned with a Yellow-nosed Albatross (*Thalas-sogeron chlororhynchus*) in beautiful plumage, but the end of one wing had been hurt, and slightly crippled it. It was in very poor condition. On the 18th I found a clutch (two) of the Rust-coloured Bronzewing (*Lophophaps ferruginea*). The eggs were laid on a few sprigs of spinifex between two boulders. On Oct. 25th I also found two fresh eggs of this bird. On May 18th I came across a family of Striated Grass-Wrens (*Amytis striata*) on the rugged range. The young had just left the nest, which was a bulky structure, with foundation of bark off a species of mulga, then made of soft spinifex, with large opening near the top. It was lined with cotton, and built in a bunch of soft spinifex. It was with the greatest difficulty I secured one of the young; they would not fly, but darted from one bunch of spinifex to another with incredible agility. The male bird sat motionless in the middle of a large fig-tree, until detected by the sharp-eyed native, and I shot it, as I did not think at the time it was a Grass Wren perching so quietly in the dense leaves. On May 22nd I found a nest of the Wedge-tailed Eagle (*Uroaëtus audax*) with one egg, on the side of a precipitous gorge in the range. The nest was easy of access from above, and contained a freshly-killed Wild Cat of large size. The same nest contained another egg on May 27th, and yet a third on June 4th. I took them all, as I did not want these birds

rearing young in the middle of a lambing paddock. On June 30th I found another nest, also containing one egg, about three miles further north in the range ; probably the same pair of birds. On June 13th, in the great cliffs at the Jardie creek, a White-bellied Sea-Eagle (*Haliaëtus leucogaster*) was sitting on her bulky nest, about one hundred feet above the water, and fifty from the edge of the cliff. On getting above I could plainly see the two dirty-white eggs. The nest was built on a large milk-bush growing on a ledge. In previous years these birds have always laid in a nest on a ledge of cliff on the opposite side of the creek, but quite inaccessible owing to the cliff overhanging. This time I determined to secure the eggs, and returned two days after with ropes and three native boys. Rigging the ropes the same way as the "climbers" on the Yorkshire cliffs, we soon had the eggs. The birds flew round without attempting to interfere, uttering an occasional cry. They afterwards took possession of a newly-built Wedge-tailed Eagle's nest further up the gorge. I took a White-eyed Crow's nest, June 29th, with the unusual number of seven eggs. Brown Hawks had eggs, and Spotted Harriers were building.

Found an Osprey's nest, July 1st, with one egg, on the 2nd one with three eggs, and two other nests containing eggs the next day. The White-headed Sea-Eagle (*Haliastur girrenera*), which is common here in the summer, especially about the Jardie cliffs, disappears in the winter to breed, where I do not know, unless in the mangroves of the Exmouth Gulf. In a large patch of mangroves near the N.W. Cape, July 2nd, Curlews (*Numenius cyanopus*) were in large flocks, which does not give them much time if they are to breed, as they appear again here on the beach regularly about the end of September. I shot one, but there were no signs of breeding. Teal (*Nettion castaneum*) were in numbers in the salt-creeks in the mangroves, and, what is a very uncommon circumstance, were in their full breeding plumage, which is rarely seen. They were breeding there, young in down being numerous, although there is no fresh water within fifteen miles. I shot a Green Bittern (*Butorides javanica*) after some trouble, as it is a very skulking bird, and I have tried before to secure specimens. July 5th, shot a Carter's Desert Bird to see if any indications of breeding. This new species was described by

Mr. North in the Vict. Nat. August, 1900. It is not uncommon in parts of the N.W. Cape peninsula. It appears mostly in the dense low scrub on the flat between the range and the sea, but also occurs in the spinifex in the high range. It flies readily when disturbed, and does not appear to creep so much as the *Amytis* and *Stipiturus*; but its flight is heavy and fluttering, and only for about twenty or fifty yards. They will lie very close after being once flushed. I have no data of their breeding except on Oct. 25th, I shot two which appeared to have been recently breeding. One of them contained a grasshopper fully an inch long, the other a quantity of small black beetles. The only noise I have heard them utter is a harsh "chat chat." Turkeys in down were noted on July 11th, the first eggs on June 4th, and the last on Aug. 28th. July 12th, found a Spotted Harrier's nest with two eggs. These birds were common this good season, and I found numerous nests up to Sept. 13th, when a nest contained two fresh eggs. The nests are built sometimes in a tree forty feet from the ground, or in a bush only four feet high. They frequently contain large Lizards in a paralysed state, placed for the benefit of the sitting bird; one nest contained four eggs.

Kites (*Milvus affinis*) were very common in 1900, but rarely visited the coast. Inland, when driving through the high grass, they were at times a nuisance, as several of them would accompany the buggy in order to feed upon the numerous grasshoppers which were disturbed in the vegetation. The birds would flit close past the horses' heads, making them startled and nervous. They appeared to catch the grasshoppers with their feet, and fed on the wing. About the middle of July numbers of their nests were to be found in the white gums. The birds appear to prefer to build towards the end of horizontal limbs. Little Eagles (*Nisaetus morphnoides*) generally build in the fork of a large straight-stemmed tree. I found a nest containing one egg on July 18th, another on the 21st with two, and one with newly-hatched young, and a fourth nest the next day with two eggs much incubated. The birds are very shy, and seem to be fond of feeding on the Teal. Black-shouldered Kites (*Elanus axillaris*) were fairly plentiful this winter, but very shy. They have not occurred here since the great drought of 1890-91. I failed to find any nests, but saw birds here early in October. About

thirty miles inland from here are numerous belts and patches of a sort of mallee timber. Several times, passing through, I have heard beautiful rich flute-like notes from a bird that kept out of sight. Being in the locality on July 20th, I determined to try again to identify it, and camped in the timber. Some hours before daybreak, by the light of the moon, the bird began its rich notes, and continued until after daylight. The native and self followed the notes a long time without seeing the bird, the song always keeping ahead as we walked. We were returning to camp somewhat disgusted, when I saw two black and white birds fiercely attacking a Crow. On going that way we noticed a bulky nest in a tree about twenty-five feet from the ground. Feeling sure this was the nest of the strangers, we sat down to wait; but the Crows made most persistent and daring attempts to steal the eggs above us. Before long one of the birds returned to drive off the Crows, and I shot it. It proved to be a Black-throated Butcher-Bird (*Cracticus nigrigularis*). The male was of a dingy grey colour, not black as was the female. The nest contained four eggs. Very curiously, as we were walking away well pleased with our success, we saw a similar nest, but not so large, about fifteen yards from the other. Again we hid, and awaited results. The birds soon came to the vicinity of the nest, and on shooting one, to my surprise, it was the handsome Yellow-throated Minah (*Manorhina flavigula*), a bird quite unknown here before. The nest was built among slender twigs at the top of the tree. However, I sent to the buggy for a tomahawk, and, cutting down another tree, trimmed its branches so as to make a rough ladder, by which I secured the two handsome salmon-coloured eggs. The nest was somewhat large, foundation of twigs, lined with spinifex and grass; the depression for eggs was shallow, that of the Butcher-Birds deep and cup-shaped.

The same trip I noted nests of *Ptilotis leilavalensis*, with eggs, young, and uncompleted; also several nests of Black-tailed Native Hen, Kestrel, and Fairy Martin. There was a small colony of the latter nests under a slightly hanging shaly cliff. Examining the nests, two were found to contain Snakes. As it was an awkward place to kill them, and I did not want to destroy the surrounding nests, I went below and fired a shot into each nest containing a Snake. A Carpet Snake, about four feet long,

came tumbling out of each; they had been tightly coiled up inside, and, when suddenly disturbed by the smashing of the nest, rolled down the sloping foot of the cliff still coiled. Each Snake contained two or three unfortunate Martins. I may mention that one very hot day last summer I went to have my dinner in a large cave in the range. Water drips from the roof, and we have a hole hollowed out below large enough to dip a pannikin in to catch the drip. Seeing no water, I foolishly thrust my hand in the hole, and felt a large Snake. After a great deal of poking it was induced to come out, and was killed. It was nearly five feet in length, and, on being cut open, was found to contain four Chestnut-eared Finches, fallen victims to their insatiable thirst. These little birds frequently build their flimsy grass-nests in the bottom part of larger nests, especially Hawks' and Eagles'.

Shot four Freckled Ducks (*Stictonetta nævosa*) on July 21st, a species which, as far as I know, has not been recorded from this district. They were fat and remarkably good eating. Plumed Whistling Ducks were in great numbers this year, and I secured specimens of Shoveler (*Spatula rhynchotis*) and Pied Goose (*Anseranas semipalmata*).

On Oct. 24th I found an egg of the Long-billed Stone Plover (*Esacus magnirostris*) laid on the summit of a high shingly ridge on the beach towards the N.W. Cape. There was no nest whatever. I took the egg (which resembled that of a Caspian Tern in colour and size, but was blunter at the small end), and, watching the bird half an hour later through my binoculars, saw it cautiously return to where it had laid, and seat itself in the empty nesting-site. In a few seconds, however, it seemed to realize its loss, and, rising, ran down the ridge to its mate. A pair or two of these birds are always at that particular spot, where the reef comes in to the beach, which is formed of coarse shingle and shell, with broken surf. I have seen odd birds south of there, but never so far as here. Noted a Tawny Frogmouth (*Podargus strigoides*), Oct. 30th, sitting on two fresh eggs in a mallee tree, about ten feet from the ground. The nest was absurdly small and slight. The bird sat motionless in an upright position, in which it looked just like a short broken dead limb, although the buggy passed immediately beneath it. On Dec. 4th the natives brought in a fledgling bird.

At the end of September, when visiting my inland run, there were great flocks of Straw-necked Ibis (*Geronticus spinicollis*) about the pools and adjoining flats. When there again on Nov. 3rd, my man in charge of stock told me that about the middle of October he had sent two boys with the bullock-cart eight miles down the creek to bring back a large iron tank swept away by the floods. They returned with quantities of Ibis's eggs, and said they had eaten a great many, and more were left; "can't finish 'um." As a colony of these birds is a rare sight—in fact, I do not know if there is any record of their breeding in West Australia—I drove down, but found most of the young birds had fledged, and only a few addled eggs were left in the nests. Of these I secured about a score. The nests were in hundreds, mostly built on low bushes flattened down by the flood, about three feet from the ground. Some of the bushes contained a cluster of six or eight nests, all interbuilt; they were of flat form, lined with white gum-leaves. A few nests were built on the ground. The colony must have been a most interesting sight when all the birds were there. A few full-grown young were about which could not fly. The native with me caught several, and of course started killing them all. However, I was in time to save one, and brought it back to the camp, where in a few hours it seemed quite content; but, as it was liable to stray too far away in pursuit of its favourite grasshoppers, we tethered one leg by a string, and fed it out of a damper-dish in which pieces of bread and meat were dropped. The bird would stand inside, and feel about for the lumps, holding its beak mostly in a horizontal position, at times almost reversing its head. After a meal it would attack, with a sharp scream, some of the fowls or young Cockatoos as far as its tether would permit; its long reach of bill giving it all the advantage. It is now at the house, with full liberty. It feeds readily from the hand, and will attack the Dogs and Cats if they venture too close. Two specimens of the rare Painted Finch (*Emblema picta*) were obtained here, and others seen; they had doubtless bred in the neighbourhood.

To our surprise, this year the large pools at my inland run on the Cardabia Creek contained numbers of small fish from four to six inches in length, and I hear they also occur in the Lyndon

River, but were certainly never there before. I think their presence can be accounted for by the action of a squatter on the Upper Minilya River, Mr. M. C. R. Bunbury, who wrote a letter to the 'Western Mail' of April 22nd, stating that in the winter of 1899 he brought a number of small fish from the Lyons River (which runs into the Gascoyne), and turned them into the Minilya, where they soon spread. The Lyndon River runs west parallel to the Minilya about twenty miles more or less to the north. Both rivers (when they do run) empty into the vast salt-marshes near the coast, but, so far as is known, do not reach the sea. The Cardabia Creek is a tributary of the Lyndon, and during the floods the fish must have come down the Minilya from Mr. Bunbury's house to the marsh, about ninety miles, then swam up to the Lyndon, about thirty miles, and thence up it and its branches. Unless they have the power of living under the dry mud, like the fresh-water Turtles and Frogs, they must all die when the pools dry up, as they are not permanent; but perhaps the spawn will serve to propagate the species.

NOTES AND QUERIES.

MAMMALIA.

Experiments in Hybridity at Pretoria.—I have at present five Zebras (Chapman's), three of which have been interviewed by a Donkey stallion ; I am very anxiously awaiting results, which I will not fail to let you know in time. I have been very successful in breeding crosses between *Mus chrysophilus* and *M. decumanus*, and have about twenty-four at present. The result of a cross between the ordinary albino *Mus musculus* with the Striped Mouse (*Arvicanthus pumilio*) is a peculiarly cream-coloured, not striped specimen, which looks very much like a cream-albino Mouse with black eyes, which stand out very distinct against the cream-coloured fur. I have also bred *Galago moholi* (*Otolicnus galago*) and *Eliomys nanus* with great ease, and am now trying to cross *Canis mesomelas* with a Collie-Dog, but have not seen any pairing yet, notwithstanding many attempts.—J. W. B. GUNNING (Director, Zoological Gardens, Pretoria, Transvaal Colony).

[The first experiment detailed above is very opportune, Mr. S. A. Deacon, of Cape Colony, having recently written in the 'Field' that he considers the Quagga to have been originally a cross between Donkey and true or Mountain Zebra.—ED.]

AVES.

The Winter Singing of the Song-Thrush (*Turdus musicus*).—I am glad that Mr. Warde Fowler has attacked this subject (*ante*, p. 212), and I hope that gentleman will work out the question involved to a final conclusion. But I must express surprise at the distinction drawn between the autumn and winter songs of the species. The Thrush is not alone in this matter—the Starling and the Robin are its companions ; and I feel convinced, from close daily observation for years at Stroud and Cheltenham in Gloucestershire, and at Eltham in Kent, that in the case of each of the above species there is no definite change of voice from autumn to winter song, but only that gradual progressive development from feeble to strong notes, and from simple to complex strains, which occurs in all song-birds (quickly or slowly) when the season of song approaches. I should be glad if Mr. Warde Fowler would ascertain from several districts whether the Song-Thrush was in voice in October.

What of October singing? Is it autumn or winter song? In September I have heard only an occasional loud note from the Thrush, but

some twittering. In October many Song-Thrushes begin to sing: *and they don't stop*, weather permitting, all the winter, but gradually attain all that excellence of variety and mimicry which makes their music as instructive as beautiful.

I beg humbly to protest, though my voice may sound as wheezy as those of Mr. Warde Fowler's female Thrushes (and I never heard such in song), against the separation of the autumn and winter singing of this species. So far as a number singing at once is concerned, emulation may have much to do with it, as it seemingly has with the sweet "chiming" of Willow-Wrens, and the musical rivalry of Robins.

For how much longer (and why) shall we continue to deny to the Thrush and other such songsters an artistic sense and love of their art—a sense which induces a marvellous variety when a dull repetition would seem as effective, and a love which leads to study hour by hour and day by day?—CHARLES A. WITCHELL (St. George's Place, Cheltenham).

The Occurrence of the Red-throated Pipit (*Anthus cervinus*) in Ireland.—When I was on the west coast of Ireland, on May 26th, 1895, I found, on a lonely mountain side in Co. Mayo, a Pipit which at the very first glance I was satisfied was quite new to me, being distinct in appearance to any Pipit I had ever seen before. The bird perched on a spray of a whin-bush, and looked full face at me, not more than fifteen yards away. The general outline of the bird, its buffish chestnut throat, extending also to sides of head and breast, and bold black-looking stripes on neck and breast, were so striking, that I was at once convinced that there was something new in front of me, and secured the bird. At that time I had never seen an identified skin of *Anthus cervinus*, and the only plate that of Bree ('Birds of Europe,' vol. ii. p. 155), which misled me somewhat, as he figures an adult male bird without much striping on neck and breast; and, being busy at the time of my return, the result was that my bird was placed away in a cabinet for future identification and overlooked, until I secured the autumn-plumaged specimen which was shot at St. Leonards, and identified by Dr. Bowdler Sharpe (*ante*, 1896, p. 101). An examination of this bird, and the investigation I then made, at once suggested to me what my own specimen was. I sent my bird at that time for identification to a gentleman who then did not fully confirm my views, stating only that it was a "queer specimen," which disconcerted me, as I was convinced from descriptions I had read that my bird must be *A. cervinus*; later, however, he has agreed with me, after another examination of the bird. My specimen is a male, and, according to Seebohm's excellent descriptions ('British Birds,' vol. ii. pp. 228–232), is in the second year's plumage, which is much worn and abraded, the tail especially showing signs of wear and tear, and would undoubtedly have been moulted that season.

From this and its movements—it remained steadfastly on the same bush, following all my movements, and seemed loth to leave the spot, just as a breeding bird would have done—I suspected at the time that the bird was breeding, and regretted much that I did not watch it to its nest before killing it. A long search afterwards for a nest was fruitless, and as I did not see another bird like it while I was on the mountain side—I was there for several days—I may have been mistaken in this surmise, as the date—May 26th—would not be too late for it to be resting only on its way to its northern breeding haunts.

It will perhaps be as well to give here a description of this bird :—The general appearance is very dark, and bold in its markings, as compared with *A. pratensis*. The throat, upper breast, commencement of flanks, and lower part of cheeks was, in the living bird, a light buffish chestnut, deepest on throat; but this has now faded to buff. Lores and round the eyes buffish white, which contrasts sharply with the dark crown. On the under parts, which are creamy white, there is a series of bold, broad, black stripes extending from throat to end of flanks, which are of an obscure buff. Belly and under tail-coverts cream-white. Top of the head and mantle have bold blackish brown centres to the feathers, broadly bordered on mantle, and faintly on crown, with cream; but the borders to most of the feathers have been worn away, giving the back a very dark appearance. Back of the neck from nape much paler, being a buffish brown. Wing-coverts, greater and median, dark brown, broadly margined with cream, which would form two bars across the wing; but this, like the tail, is much worn and abraded. Outer tail-feathers have the outside portion white from the base, inside dark brown, as are all the others excepting two central ones, which are lighter brown; the tips only of second pair appear to have been white, but, as I have before said, this member is so worn and short, that not much can be judged of it. Legs and toes dark brown. Bill, upper mandible dark brown, lower pale brown. Axillaries yellowish white on outer portion, inner fringe greyish.

On Aug. 9th, 1898, Mr. H. Elliott Howard shot a Pipit in Co. Donegal, which he most kindly presented to me, while still in the flesh, on the following day, as it was on the morning of his return to England when he procured the bird. This bird at once arrested Mr. Howard's attention, from the conspicuous dark lines with nearly white margins on the mantle, which were distinctly observable both when the bird was on the ground and during flight. This specimen is remarkably distinct in its markings, and much easier to identify than the St. Leonard's bird; indeed, it could not be mistaken for a Meadow-Pipit, and directly Mr. Howard handed the bird to me I said that it was either a Red-throated Pipit, or the St. Leonard's bird was not correctly identified; but there need not be a shadow of doubt

on this point. From Seeböhm's description I should say that the bird is an adult male in winter dress, and was in full moult at the time it was procured. Mr. Howard saw others, and under circumstances which led him to suppose that they had been bred in the district. On this score also Mr. Howard's surmise may be wrong, and the birds he saw may very likely have been a small flock, or family party even, resting on their return migration, as the date in this case also favours this view. Nevertheless, it is quite possible that the bird may occasionally breed on the north-west or west coast of Ireland—Mr. Howard has not met with the bird since, although he has several times returned to the coast; neither did I see it the last time I visited Donegal, and paid special attention to Pipits—and has been overlooked by Irish naturalists, from the fact that the spot where the bird was found is very secluded, and the ground is strictly preserved, no person being allowed to carry a gun in the district without the permission of the lord of the manor. In this communication I have purposely clouded localities—the counties only are sufficient; but I am pleased to say that should any of the birds return at any time there is not much danger of their retreat being invaded by collectors.

During my journey across Ireland from west to east, I paid special attention to Meadow-Pipits, after procuring my specimen, and did not see any more like it; they were all of the type with which I am so thoroughly familiar, but perhaps slightly darker on the upper parts when nearest the east coast. On the west coast they struck me as being distinctly greyer on the mantle and upper parts generally than in the typical birds. The general appearance of Mr. Howard's bird is very bold and striking. The throat is pale buff, breast and flanks a rich brownish buff, graduating into cream on the middle portion of breast and belly, under tail-coverts rich cream; from the throat to end of flanks a series of bold black stripes, but not so broad as in the summer specimen. Crown dark brown, centre margined with fawn-brown, cheeks and neck an obscure greyish brown, tinged with buff on ear-coverts. Mantle broad, black, centres with very distinct buffish white margins on the scapular region; middle of back and rump a more obscure black, margined with fawn-brown; upper tail-coverts fawn-brown, with more dusky centres. Tail—two centre feathers missing—blackish brown, fringed with light fawn, excepting two outer feathers, which have the outer portion dusky white to the base; second pair tipped only with dusky white. Wing—closed—dark hair-brown, margined with buff, the median and greater coverts broadly margined with a lighter buff; axillaries palest straw-yellow on outer portion, obscure grey on inner. Bill dusky along culmen and tip, other parts pale brown. Legs and toes whitish buff, nails dark umber. The general appearance of the bird fully bears out its specific name *cervinus*—fawn-coloured.

It will perhaps be remembered by some how much controversy was, in 1896, centred round the assertion I made (*ante*, 1896, pp. 101, 193, 256, 300, 302, 353) in connection with the St. Leonard's bird, *viz.* that the markings were so distinct that I could distinguish the bird amongst a flock of Meadow-Pipits with or without the aid of field-glasses. After my experience with the Pipits here recorded, and increased observations here, and with other Pipits in Iceland and elsewhere, I repeat my assertion with redoubled emphasis. Any ornithologist who thoroughly educates his eyes to the outlines and general appearance of our native birds in the field ought to be able to distinguish between *A. pratensis* and *A. cervinus* in autumn or winter plumage—giving, of course, a moderate range—without difficulty. The Pipits are certainly a puzzling class of birds, and resemble each other closely in plumage; but there is, in addition to their distinct songs, a difference in *build* between them, which is most noticeable; for instance, the difference in build between *A. trivialis* and *A. pratensis*, when either may be feeding in small flocks in a meadow in early spring, ought to be clear to any acute observer without having to trust to the notes of the birds. This difference in build is also very striking in other Pipits I have seen abroad. I know that it must be most difficult for those who have to deal chiefly with skins in a cabinet to appreciate this difference; to do so there must be a thorough acquaintance with the birds in the field.

In conclusion, these two Irish examples of *Anthus cervinus* have remained in my cabinet unrecorded for unavoidable reasons, and waiting until I had an opportunity to send them to an authority to confirm my identification. Recently Mr. O. V. Aplin paid me a visit, and had no hesitation in pronouncing them specimens of this bird; and, as Mr. Aplin has shot dozens of them abroad, and is well acquainted with their general appearance and changes of plumage, his identification, added to the unmistakable descriptions of Middendorff, Bree, and Seebohm, may, I think, be taken as settling the point.—F. COBURN (7, Holloway Head, Birmingham).

Rosefinch released in Devon.—Having to proceed to England on leave, I took the opportunity of bringing with me some specimens of the Rosefinch (*Carpodacus erythrinus*), in order to release them in England. Two or three died on the voyage, and one escaped, out of the dozen I originally started with; but I was able to release the remaining birds from the train soon after it left Plymouth on June 16th, and had the satisfaction of seeing them go off strong on the wing, although they were not in very good condition of plumage, and could mostly be easily recognized as captive birds if shot by anyone at present. I did not like, however, to keep them longer, as in the cage—a fairly large one—they did nothing but eat and fight, and were getting grossly fat. I am sorry to say that all are males, females being almost unprocurable in Calcutta this year. But as the female Rose-

finch has occurred in England, I hope they may find mates if they remain in the country. At all events, those who make a practice of destroying rare birds will hereby be warned to be suspicious of the Rosefinch in Devon at present, for such of these specimens as get successfully through the moult will, of course, be undistinguishable from wild arrivals. One bird's leg has been broken above the hock, and has healed again; so this individual may be recognized if procured.—FRANK FINN (c/o Zoological Society, 3, Hanover Square, London).

A Stronghold of the Chough.—There is as much, if not more, satisfaction in recording the prosperity of a rare resident British bird as in announcing the capture of the most extraordinary stragglers to our shores. *Pyrrhocorax graculus* is a species whose distribution, on the sea-cliffs of our islands, has been steadily narrowed; and, as it is a very sedentary bird, there is no probability that once exterminated it will ever re-establish itself. I have within the last few years paid three visits to a spot on the western coast of Scotland, where the Choughs, if not abundant, are at least firmly established and prosperous. They suffered very severely during the hard weather at the beginning of 1895, but since then I am assured they have increased. They nest in three spots on this island—all very inaccessible cliffs on the seashore—and very likely these three colonies keep more or less distinct. I was anxious to ascertain how many pairs there were, which is obviously difficult to determine; and the gamekeeper assured me that there were "several hundred pairs," and that there was not the slightest danger of their becoming extinct. According to my observation, the birds hardly ever leave the sea-coast. I have seen small parties flying perhaps half a mile inland: their calls as they pass over immediately attract the attention of an ornithologist, and much resemble those of a small party of Jackdaws, but are rather shriller. I have also watched them on the rocks at low tide, apparently searching for food. The position of their nesting-places makes it practically impossible to rob them, and I do not think the birds are persecuted by anyone. The gamekeeper took some young ones, but failed to rear them; they make very engaging pets, I believe. A nest with eggs was also recently taken by the keeper for an American museum. The birds may be identified at a great distance with a glass, both when flying and perching, by their long red bill. As far as I can discover, the west coast of Scotland is now the chief stronghold of the Chough, though it has become extinct in some of the islands within comparatively recent years. There are still some in Ireland, in Wales, in Devon, and in Cornwall. Mr. Harting, in his admirable 'Handbook of British Birds' (p. 93, new and revised edition), mentions Dorsetshire. Without making public the exact locality (as I have purposely refrained from doing), I should be interested if some Dorsetshire correspondent would

define the position of *P. graculus* in the fauna of Dorset at the present day.
HAROLD RUSSELL (16, Beaufort Gardens, S.W.).

Hoopoe at Reigate.—On the evening of June 22nd I happened to be wandering in Reigate Park, in Surrey. Entering the park by the gate opening into Bell Street, I had taken the path through the woods to the right near the meadows, and had not gone more than a couple of hundred yards when a bird flew across into the park from the low fields to the right. It settled on the ground about thirty yards off, and I had a good look at it before it flew on. It was a Hoopoe (*Upupa epops*). The occurrence at Reigate of so rare a visitor should, I think, be recorded.—C. T. BINGHAM (31, Earl's Court Square, South Kensington).

[This is a most interesting observation. The bird was recorded from the same spot in the 'New Flora of Reigate,' 1856 (*cf. ante*, p. 247).—ED.]

Spoonbills at Great Yarmouth.—Scarcely a day has passed since early April to this day of writing (June 21st) but on what one or more Spoonbills (*Platalea leucorodia*) have been in sight on Breydon. First one was seen on April 10th, twelve on April 27th, and five more next day—seventeen in all! Seven observed on May 7th; I saw two on May 16th quite near my houseboat, and I sailed up to a couple on May 17th. Two asleep near my houseboat on June 2nd, in company with Saddleback Gull, on most amicable terms. Saw four again on June 7th, which were very tame, and with some two hundred Gulls on a flat quite near the bridge now being built across Breydon. On June 15th observed five being followed and disturbed by a Heron, and on June 21st four were still about.—A. PATTERSON (Ibis House, Great Yarmouth).

Wigeon breeding in Ireland.—Believing that the Wigeon (*Mareca penelope*) bred within a few hours' riding of my home, I decided, on May 1st, accompanied by my friend Mr. S. Savage, to make a raid on its breeding-place. We started at five o'clock in the morning on a lovely day. After a long ride and a longer tramp, we at last came on the object of our search—a nest with eleven eggs. The nest was in a dry meadow among rushes, about two hundred yards from a small lake. I also found another nest with three eggs, this time in a wet swamp. Later on Mr. Savage found another nest with nine eggs in a clump of rushes in a very dry meadow. We went home that night with very light hearts, having had, I believe, a very good day's experience. To make sure, I sent some of both down and eggs to Mr. Ussher, and also to Mr. Patterson, which they kindly identified as genuine Wigeon without any doubt. I think this is the first record of the Wigeon breeding in Ireland.—JOHN COTTNEY (Hillsborough, Co. Down, Ireland).

Pairing Manœuvres of Pigeons, &c.—With reference to Mr. E. Selous's remarks on the covering of the male domestic Pigeon by the hen after normal pairing, I may mention that I have frequently seen this action myself, and believe it to be not unusual. The behaviour of birds *after* pairing has not yet received sufficient attention from observers. I have myself noticed that the male Zebra Finch (*Taniopygia castanotis*), after pairing, vibrates his tail so quickly that it is almost invisible; and that both sexes of the Larger Tree-Duck of India (*Dendrocynna fulva*), as soon as the action is performed, "tread water," with one wing raised, in a very curious fashion. These manœuvres are, I think, simply due to general excitement; but such performances are worth recording, as often, if occurring *before* pairing, they would be set down as gestures designed for sexual attraction. — FRANK FINN (c/o Zoological Society, 3, Hanover Square, London. W.).

Little Bustard in Derbyshire.—On May 14th a Little Bustard (*Otis tetrax*) was shot by a farmer on Middleton Top, near Youlgreave, North Derbyshire. He saw that his victim was something uncommon, and took it to a local stuffer. The sex was not determined by dissection, but no doubt the bird is a female, as the plumage is devoid of all ornaments. This is only the second recorded appearance of the Little Bustard in Derbyshire, the first being in 1797. This specimen is now in my collection.—W. STORRS FOX (S. Anselm's, Bakewell).

Birds in Lisbon.—Our ship came into the Tagus on April 17th, and the following notes refer to the birds observed in Lisbon or the neighbourhood during the five days I spent there. After some Gannets at the mouth of the river, the first remarkable bird was a Kite, who, in company with Sea-Gulls, flew up and down the river opposite the town. I saw it again on a subsequent occasion flying backwards and forwards in easy graceful circles, often within a few yards of the quays, now and again swooping down upon some scrap of offal which the current brought past. From its forked tail and mottled rufous plumage, I was able clearly to identify it as *Milvus iclinus*, the same species who used to perform the office of scavenger in London in the Middle Ages. The Gulls were for the most part in immature plumage. The vast majority of the adult birds were Lesser Black-backed Gulls. Next in numbers came Herring-Gulls, which, I think, were all of the yellow-legged species—the *Larus cachinnans* of Pallas. In Vigo Bay, on the Spanish coast north of Lisbon, I was able clearly to see the brilliant yellow legs and rather darker mantles of these birds. Whilst on the journey home, at Cherbourg, I could see with equal certainty the flesh-coloured legs of the ordinary British Herring-Gull. A few birds seemed to be Common Gulls, and a great number, with hoods in various stages of completeness, belonged to the black-headed family, which, from the deep

blackness of their heads, I put down as Mediterranean Black-headed Gulls. Lisbon differs strangely from the towns of Southern France and Northern Italy in being full of bird-life. From every garden came the notes of the Blackcap, already nesting, and on the whole the commonest songster. I had rather expected to meet with the Orphean Warbler, but it may be that (as none of this species pass the winter in Europe) it had not arrived, or that it is confined to the country and the olive-gardens. Goldfinches were abundant. The call-note of the Greerfinch was to be heard on every side. The Great Tit was vociferous, and I saw Blue Tits busily engaged in destroying the blossom on the trees. In the cypress-grove at the English Cemetery there were many Blackbirds, who seemed to find there a retreat from the heat, and an abundance of snails among the grave-stones. Thrushes, on the other hand, were remarkable by their absence. I saw a few Redbreasts, and heard one singing (a strange and powerful song it seemed to me) at Cintra. In the Botanic Gardens and elsewhere a Warbler of an unknown species was diligently searching the trees for insects, and singing a pleasant song; its habits and movements were those of a large Willow-Wren, and I identified it to my satisfaction as the Melodious Warbler. My only doubt is that so reliable an authority as Colonel Irby declares that it does not arrive in the south of the peninsula till April 25th. The sky everywhere was alive with Swifts, whirling and screeching overhead. Swallows and House-Martins were also plentiful, though neither had reached England when I left. I saw Swallows descend in the busiest street to gather mud from between the tramway-lines. The Chaffinch was a common cage-bird, but I saw none out of captivity. The absence of Chiffchaff and Willow-Wren was surprising, but still more the absence of Jackdaws; for, though most steeples fell in the great earthquake of 1755, there are still plenty of desirable nesting-sites. In the market I saw cages with Turtle-Doves, but, from their demeanour, they had been some while in captivity. From the train, a few miles out of the town, I saw a Stonechat. The woods of Cintra resounded with the call of a Woodpecker, very similar to that of our "Yaffler." I judged it to be that of *Gecinus sharpii*. The only Wagtail I saw was near a pond at Cintra, and belonged to the beautiful blue-headed species (*M. flava*), varieties of which have received many different names. In the lodge of Gardens of Monserrate there was a much decayed specimen of a small raptorial bird which may once have been a Hobby. I looked in vain for the Iberian Sparrow, but the House-Sparrows were abundant. It is one of the ornithological sights of Lisbon to see them go to roost in the trees of the Avenida. They weigh down the acacias in their thousands, and their twittering is like the crash of a waterfall. It is said that people with nerves have to avoid apartments which look upon that street. The only signs of migration on the

voyage out and back were many pairs of Puffins, which seemed to be making their way in couples to their nesting haunts, and a Tree-Pipit, which came on board in the middle of the bay half-way between Finisterre and Ushant on April 23rd. The sea was calm; the wind light, and from the north-east. The bird flew some way alongside of the ship before alighting in a ruffled, but not exhausted, state. In the English Channel small parties of Swallows were flying across, near above the water, and with great speed.—HAROLD RUSSELL (16, Beaufort Gardens, S.W.).

With the Birds in May, 1901.—I can but very seldom take a holiday in May, but this year I was enabled to be absent from home for the month, and spent most of my spare time in observing the birds in and near the places I visited.

London and its Vicinity.—Here I visited some of the localities mentioned by Mr. Swan in his 'Birds of London' as likely to be fruitful, and found that Hadley Woods and Richmond Park were admirable hunting-grounds for the ornithologist.

Hadley Woods, between New Barnet and High Barnet, are $11\frac{1}{2}$ miles from King's Cross, and in this delightful resort I found the Nightingale, Blackcap, Garden-Warbler, Willow-Warbler, Chiffchaff, Greater and Lesser Whitethroats, Whinchat, Spotted Flycatcher, Green Woodpecker, Long-tailed Tit, and many other birds less worthy of notice. Nightingales, Blackcaps, and Lesser Whitethroats were exceptionally numerous. I should think that nearly all our summer birds could be found in these delightful woods.

Wanstead Park and lakes will well repay a visit, and there too I heard the "three feathered kings of song"—the Nightingale, Blackcap, and Garden-Warblers; but the avifauna was not so rich as that of Hadley Woods.

At Richmond Park, I noted, in about three hours, thirty-four species, including Nightingale, Blackcap, Garden-Warbler, Wood-Warbler, Redstart, and Ray's Wagtail. This highly favoured locality will always repay a visit from the bird-lover, and, indeed, from any lover of nature. Windsor Castle was again plainly visible in the far distance.

My next visit was to that most delightful of all health resorts, Bournemouth, and there I found the lovely Talbot Woods full of bird-life. I have never heard the song, or rather songs, of the Wood-Warbler to such perfection as there. The Tree-Pipit also was much in evidence, and, what was very strange, I heard there a Chaffinch, which, after its three prefatory notes "fritz fritz fritz," sang the Willow-Warbler's song, and not its own.

At Christchurch, five miles from Bournemouth, I found many birds in a pleasant row down the River Stour towards Hengistbury Head. My list

of thirty-seven species in about three or four hours included the Reed and Sedge-Warblers, the Lesser Tern (also observed at Weymouth, May 13th), and other interesting birds.

The New Forest: In a walk through Lyndhurst to Emery Down and Brockenhurst, I only added the Stock-Dove and Nuthatch to my former lists; but I found the Wood-Warbler especially numerous there also.

At the close of our visit to delightful Bournemouth, we journeyed to Weston-super-Mare, which I found also an excellent station, especially in the Bleadon and Uphill direction. There I saw and heard more than one Gull-Bunting, and at Brean Down had a fine view of a small flock of Sheldrakes disporting themselves in the sea. The Raven still breeds on this lofty promontory, and Mr. Pople, our boatman, assured us that about two hours before our arrival two old birds, accompanied by five young ones, had for some time hovered over their heads; unluckily they did not favour us with an appearance.

I have kept to the close of this rambling communication the following incident:—On Sunday, May 12th, when walking up the Vale Road, Bournemouth, I heard a bird in the shrubbery of Carlton House, whose note I believed I recognized at once as that of the bird I had heard only at Karlsbad and at Brunnen in 1893, and I said to my wife, "That's Bonelli"; alluding to Bonelli's Warbler, which was identified for me by Rev. W. Warde Fowler on the Axenstein some years ago. On the 14th I heard and saw the bird again, and called at Carlton House, where the proprietor, Mr. Hamlet Kinsey, received me most kindly, and said that he had been watching that bird for some days, that he had never heard one like it before, and wondered what it could be, as his attention had been at once arrested by its unfamiliar note. I wrote at once to Mr. Warde Fowler, and had a reply from him, in which he said: "Your description of the bird, as you saw it, is Bonelli all over; your account of the song is utterly puzzling. The only conclusion I can come to is that it is either Bonelli's or Benson's Warbler, and which I can't say." Nor can I, nor do I lay any claim to be the discoverer of this Warbler in England. My object is rather to direct the attention of other ornithologists to the matter, who may have longer opportunities of observing the migrants on the south coast of England than I had, or can have.—CHARLES W. BENSON (Karlsruhe, Montpelier Hill, Dublin).

REPTILIA.

Black Adder in South Wales.—On Thursday, June 13th, I received, from the Rev. D. H. Davies, Cenarth, South Wales, a serpent for identification. It is a Black Adder, a variety of our poisonous reptile extremely rare in this country, there being only two British specimens at South

Kensington. This specimen is $20\frac{1}{2}$ in. long, a female. I hope to say more about this later on. A fatal case of Adder-bite in a boy $4\frac{1}{2}$ years old is reported to me from Cumberland by Dr. Eden Cass (June 18th, 1901).—GERALD LEIGHTON (Grosmont, near Hereford).

PISCES.

Spotted Ray at Great Yarmouth.—On March 18th I saw, in this town, a Spotted Ray (*Raia maculata*), which may be described as of the size of a dinner-plate. It possessed a complete and well-formed fin, the size of a business envelope, erect upon the centre of its back. It could easily be raised or depressed to one side, and may not have been greatly inconvenient to the fish when living.—A. PATTERSON (Ibis House, Great Yarmouth).

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I am preparing a list of the Birds of Berkshire, and shall be very much obliged to any correspondents who will be good enough to forward particulars of rare or interesting wanderers that may have come under their notice.—H. NOBLE (Temple Combe, Henley-on-Thames).

NOTICES OF NEW BOOKS.

Animal Life : a First Book of Zoology. By D. S. JORDAN, Ph.D., &c., and V. L. KELLOGG, M.S., &c. Henry Kimpton.

SINCE the publication of Semper's 'Animal Life,' we know of no book that has so surveyed the field of animal bionomics as this volume. The standpoint of the authors, however, is very different. Semper was outside the cult of Neo-Darwinism; Jordan and Kellogg will probably satisfy the canons of that apparently now dominant school of thought. When the perplexed evolutionist, wearied and unsettled with the new theories of advanced disciples, now and again goes back to the teaching of the master, and reperuses that wonderful argument in the 'Origin of Species,' he finds that Darwin records the facts and seeks an explanation for them in the doctrine of "natural selection." In the modern literature the method seems somewhat reversed, "natural selection" being taken as the fact, and the details of animal life as its evidence. There may be little intrinsic difference in the two positions, but the first requires argument, whilst the second relies on evidence too little submitted to cross-examination. Throughout the volume we are noticing this latter position is very pronounced, and we watch the natural transition of theories into dogmas.

The chapter on "Instinct and Reason" is one among the many interesting subjects discussed in this suggestive book, and here the argument enters the psychological arena. Our authors define instinct as "automatic obedience to the demands of external conditions," and state that it "differs from other allied forms of response to external conditions in being hereditary, continuous from generation to generation." But though it is stated "this sufficiently distinguishes it from reason," we are told that the line between the two "cannot be sharply drawn." This rather minimises the subsequent complaint that the "confusion of highly perfected instinct with intellect is very common in popular discussions."

The pages are always interesting, and very many are beautifully illustrated; but the figure of the *Kallima* butterfly given in support of "mimicry" is of an "hereditary" character, still showing the insect with the head uppermost on the twig, despite the many recent corrections that have appeared to the effect that the butterfly when at rest has head downwards.

A Synopsis of the Mammals of North America and the adjacent Seas. By DANIEL GIRAUD ELLIOT, F.R.S.E., &c. Field Columbian Museum, Publication 45. Chicago, U.S.A.

THIS is a most valuable synopsis of the Mammals of North America, but the knowledge and industry displayed seem to be in an inverse ratio to the strength of purpose in the author. Mr. Elliot recognizes the plethora of proposed species in his fauna: "A considerable number of the so-called species and subspecies contained in this volume will eventually swell the list of synonyms already sufficiently formidable." He further makes the remark that in late years there is an inclination to unduly separate in a specific sense "at the risk of reducing the science to one founded on labels and localities, instead of distinctive and prominent characters." He clearly states that "there is hardly a genus of North American mammals that does not contain too many named forms," but decides that the present time cannot be supposed "as opportune for a final and satisfactory revision." We regret this decision: either the criticism need not have been made, or it should have been pressed home by the author's revision. In the purely artificial canons of nomenclature, where the greatest liberty—if not licence—is observed, it requires no more courage to dethrone than to elect in a process that Mr. Elliot recognizes as largely one of names. One statement deserves special attention, as presumably applied to species not described on outside colouration, or non-essential measurements, but absolutely founded on cranial characters, and that is that these are subject to a large element of error, for "the lack of resemblances often observed among crania is frequently but the individual variations of a type." In this work crania are mostly, if not entirely, figured so that the caution becomes authoritative.

There can be little doubt that this synopsis of the Mammals of North America will for some time hold the field; it is, like all

American biological publications, lavishly illustrated, the figures being entirely of an osseous character. But we still wish that the author had, and we shall continue to hope that he will, in the light of his strictures, publish a revision, and give evidence of the faith that is within him.

Our Country's Shells, and how to know them ; a Guide to the British Mollusca. By W. J. GORDON. Simpkin, Marshall & Co., Ltd.

OUR country's shells and how to name them is really the aim of this little book. A knowledge of the British Mollusca is something quite distinct, being related to the animal, and not only to his dwelling place. However, everything comes in time ; first a collection of shells, and then a desire to know something of their inhabitants. As an aid to recognize species, this compilation by Mr. Gordon is admirable, and is the main end of a profusely illustrated brochure. Few will probably read the classificatory chapters, but Chapter V., in its introductory paragraphs, has the charm of real natural history. "We grow in knowledge as we grow in years" ; but oh to be a boy again, with an inexpensive book like this in our pocket, and all the seashore before us ! Thirty-three chromo-lithographic plates are said to illustrate every British species.

Taxidermy : comprising the Skinning, Stuffing, and Mounting of Birds, Mammals, and Fish. Edited by PAUL N. HASLUCK. Cassell and Company, Limited.

IN his preface to this small and very inexpensive publication, Mr. Hasluck informs us that "This Handbook contains, in a form convenient for everyday use, a comprehensive digest of the knowledge of Taxidermy, scattered over nearly twenty thousand columns of 'Work,' a weekly journal, and that the information was originally contributed by Mr. J. Fielding-Cottrill." It is certainly one of the simplest little books on the subject which we have seen, and the information is imparted in a concise and easily understood way. It also contains a chapter on "Preserving, Cleaning, and Dyeing Skins," and another on "Preserving Insects and Birds' Eggs." One of the best injunctions in the work is—"Beginners are advised not to purchase the 'boxes of bird-stuffing tools' as advertised, or they may find half of the tools useless, and the other half unnecessary."

EDITORIAL GLEANINGS.

At the Meeting of the Zoological Society, held on June 18th, the interesting mammalian discoveries recently made by Sir H. H. Johnston were discussed. A communication was read from Prof. Ray Lankester on the new African mammal lately discovered by Sir Harry Johnston in the forest on the borders of the Congo Free State, of which two skulls and a skin were exhibited. Prof. Lankester fully agreed with Sir Harry as to this mammal belonging to a quite new and most remarkable form allied to the Giraffes, but having some relations to the extinct *Helladotherium*, and proposed for it the generic name *Okapia*, from its native name "Okapi." The scientific name of this mammal would therefore be *Okapia johnstoni*, Mr. Sclater having already given it a specific name based on the pieces of its skin previously received. Sir Harry Johnston, who was himself present, gave an account of the facts connected with his discovery of this animal. Sir Harry also stated that during his last excursion to the north of Mount Elgon he had found large herds of a Giraffe in this country which appeared to be distinct from previously known forms of this mammal in having five bony protuberances on the head, four placed in pairs, and one anterior in the middle line. Four examples of this animal were now on their way home, and would soon be here to settle the validity of this presumed new species.

At a Meeting of the Linnean Society of New South Wales, held on April 24th last, Mr. Coleman Phillips, a visitor, addressed the meeting on the subject of Rabbit extermination. The speaker, a resident of South Wairarapa, New Zealand, explained that in his district Rabbits are successfully kept in check by the operation of introduced natural enemies (Ferrets, Stoats, and Weasels), and the spread of diseases (bladder-worm, liver-rot, scab, and lice). Trapping, fumigation with bisulphide of carbon, and reliance solely upon poisoning or wire-netting, he considered to be methods altogether wrong in principle. He advocated in preference those which had been successfully tried in New Zealand; and at the same time he expressed his astonishment that in Australia anything like organized effort of the right kind in dealing with so important a matter seemed conspicuously absent.

ALL who have been in any way connected with our excellent contemporary, the 'Annals and Magazine of Natural History,' will probably have been brought in contact with Mr. Alfred Whitehouse, whose recent death we greatly regret. Mr. Whitehouse, at the time of his decease, was fifty-five years of age, and had been with the well-known firm of Taylor and Francis for forty-one years.

MOST students of evolution will remember, and probably possess, a small volume entitled 'Darwinism and other Essays,' by John Fiske, M.A., &c., published in 1879. It was with great regret that we read in the 'Times' of July 6th a notice of the death of the author. From that notice we learn that Mr. Fiske died on the 4th inst. of heat apoplexy at Gloucester, Massachusetts. He was born in 1842, and his original name was Edmund Fiske Greene, but he subsequently adopted the name of his great-grandfather, John Fiske.

THE Syndics of the Cambridge University Press have undertaken the publication of an important work on the Fauna and Geography of the Maldiv and Laccadive Archipelagoes. This work comprises the results of the first scientific expedition that has visited the Maldives and Laccadives. These groups, over 1000 miles long by 70 broad, and comprising about 1500 islands, were surveyed by Capt. Moresby in 1834, at a time when the natives were still unfriendly. Beyond the published charts there is no detailed information respecting them. The expedition, consisting of Mr. J. Stanley Gardiner, Mr. L. A. Borradaile (Selwyn College), and Mr. C. Forster Cooper (Trinity College), passed eleven months in the two groups, during which an attempt was made to survey the area as thoroughly as possible. The chief object of the expedition was to investigate the interdependence of the physical and biological factors in the formation of atolls and reefs. To this end upwards of three hundred dredgings were taken, a large number of soundings were run, and every group of organisms was carefully collected. As a type atoll, Minikoi was chosen on account of its isolation, almost midway between the main reefs of the two groups. The three months, June to September, of the south-west monsoon were spent here. In the Maldives the land and reef fauna of Hulule atollon was collected for comparison with Minikoi. For the rest, eleven out of seventeen atolls were visited, including about two hundred islands, in a cruise of five months' duration, on a schooner and boats lent by the Sultan. Later a steamer was chartered from Ceylon, and four other atolls, including Suva-diva and Addu, were dredged and surveyed. The work will be published in eight parts, of which the first will appear in October, 1901.

FROM Cambridge we have received the Thirty-fifth Annual Report of the Museums and Lecture Rooms Syndicate. Zoological science is not neglected at Cambridge, and the additions to the collections there seem most important and somewhat prodigious. We have already referred to Mr. Gardiner's expedition to the Maldive and Laccadive Archipelagoes. The collections made by the Skeat expedition to the Malay Peninsula are still being worked out by specialists. Amongst other acquisitions, we read that the collection of specimens dredged by the Royal Indian Survey Ship 'Investigator,' many of them belonging to the deep-sea fauna, is a most valuable addition, for which the special thanks of the Museum are due to the Indian Museum at Calcutta. Dr. Haddon's collection of Actiniaria is a gift the value of which is largely increased by the fact that much of his published work refers to this group of animals. Mr. Budgett's second visit to the Gambia was most successful. He returned to Cambridge in the autumn with some remarkable Teleostean embryos, a complete set of *Protopterus* embryos, and a larva of *Polypterus*, all of which are obtained for the first time.

It is with great sorrow that the Superintendent records the death of F. P. Bedford, B.A., scholar of King's College, on Oct. 7th, 1900. He had recently returned from a zoological expedition to Singapore, and some of his collections have been presented to the Museum. A cabinet for the reception of the skins of birds has been given to the Museum by Mrs. Bedford, in memory of her son's interest in zoology.



Y^{rs} very truly
Eleanor A. Ormerod

THE ZOOLOGIST

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THE RARER BIRDS OF THE SOLWAY FIRTH.

BY THE REV. H. A. MACPHERSON, M.A.

THE region which lies around the upper waters of the Solway Firth has experienced important changes since the days when Roman legions manned the forts that overlooked the channels of this great Firth against the attacks of northern warriors. Great forests of oak and other indigenous timber then extended from the base of the hills to the sea-beach. The foreign garrisons must have needed trustworthy guides when they sent out parties in search of forage, for so difficult was the country, and so dangerous were the watery depths of its reed-fringed morasses, that the utmost care must have been needed to avoid ambushed parties of the enemy. The forest glades in which the hind cropped the coppice-wood have long since been furrowed by the plough; the pedigree Shorthorn grazes on pastures over which herds of Aurochs once stampeded. Even the Bittern has no abiding-place among the bogs that still linger in the Abbey Holme. It is the preservation of such isolated tracts of broken moorland as we find in Salta Moss or Weddholm Flow that help us to picture this area as it existed in the days of our distant forefathers. The romance that once invested this wild country has well-nigh disappeared. Only here and there can we find the Merlin or the Short-eared Owl feeding their downy young among

the heather; even the Red Grouse is scarce as a breeding bird upon the moors which lie adjacent to the foreshores. The numbers of the very Dunlins that nest in the tussocks of the salt-marshes have grown fewer within our own recollection.

But there is no material change in the numbers of migratory birds which appear in the neighbourhood of the Firth at different seasons of the year, and close study has enabled us to gauge of their movements with greater accuracy than would have been possible formerly.

Ornithologists have their share of "hopes deferred," and the writer has to own to many disappointments. Though it is believed that *Anthus cervinus* has twice occurred in the neighbourhood of the Firth in spring plumage, no specimen has ever been secured. A Black-throated Wheatear of some description has visited the vicinity of the Solway Firth in three different springs, but no final proof of its identity has been obtained. Several other species are still excluded from the ornis of this region, because their identification, in spite of much labour, is still lacking. But the data at the disposal of the writer extend over so long a period, that he feels justified in offering for consideration the following observations:—

1. *The Absence, or exceptional Presence, of North American Birds.*—The arms of the Solway Firth extend in a south-westerly direction into the Irish Sea, an area swept by heavy gales and frequent hurricanes. It would not be unreasonable to expect that such common Passerine forms as *Turdus migratorius* or *Loxia leucoptera* might occasionally be transported by some ocean liner to within a reasonable distance of the Firth, and be driven ashore; but the only species that have been reported to the writer as captured at sea represented such familiar Palæ-arctic species as *Fringilla cœlebs*, *F. montifringilla*, or *Turtur communis*. We cannot even claim that *Tringa maculata* has occurred within our precise limits, often as that bird has been killed in Britain. *Macrorhamphus griseus* and *Tryngites rufescens* have occurred in single instances, but very far up the Firth, and only in the month of September. Of the *Anatidæ*, *Ædemia perspicillata* has only once been obtained in the vicinity of the Solway. *Querquedula discors* has once occurred in Dumfriesshire, at no great distance from the Solway Firth.

2. *Birds from Eastern Europe*.—Mature reflection favours the belief that comparatively few species visit the shores of the Solway Firth from Eastern Europe. We have no local finds of *Turdus varius* or *T. sibiricus*; no rare *Phylloscopi*; no notes of *Lanius minor* or *Muscicapa parva*; no Asiatic Buntings; and not one occurrence of *Falco vespertinus*. It is true that *Saxicola isabellina*, *Tadorna casarca*, *Glareola pratincola*, *Cursorius galli-cus* have visited us at long intervals; but what are these among so many absent species? It must be admitted that *Anthus richardi* and *Pastor roseus* are believed to have occurred repeatedly, the former species in both spring and autumn. *Ruticilla titys* has only twice occurred, yet it cannot be easily overlooked, as it occurs so late in the season. In vain have we searched, year after year, for such birds as *Totanus stagnatilis*, *Charadrius fulvus*, *Recurvirostra avocetta*, or *Numenius tenuirostris*. It is conceivable that some of the commoner British birds visit us from the east, such as *Garrulus glandarius*; but an incursion of Jays is at least as likely to owe its *fons et origo* to the pine-woods of Norway. Certain birds, of which *Anthus richardi* is the safest example, do appear to visit us from the east; but most eastern Palæarctic birds are chiefly remarkable for their absence.

3. *Birds from Scandinavia*.—A number of species appear to visit the Solway Firth from Scandinavia, including *Turdus pilaris*, *T. iliacus*, *Lanius excubitor*, *Bombycilla garrulus*, *Acanthis linaria*, *Fringilla montifringilla*, *Chrysomitris spinus*, *Corvus cor-nix*, *Otocorys alpestris*, *Dendrocopus major*, *Buteo lagopus*, *Asio brachyotus*, *Columba palumbus*, *Clangula glaucion*, *Mergus mer-ganser*, *Streptilas interpres*, *Scolopax rusticula*, *Gallinago galli-nula*, *Machetes pugnax*, *Totanus canescens*, *Limosa lapponica*, *Colymbus septentrionalis*. But of these, *Machetes pugnax* only occurs—normally, at any rate—in autumn; while *Otocorys alpestris* and *Buteo lagopus* have hitherto proved to be very rare visitors. Possibly *Chrysomitris spinus* and *Mergus merganser* visit the neighbourhood of the Solway Firth from the north of Scotland. *Acanthis linaria* is relatively rare in the neighbour-hood of the Solway Firth, or at any rate *appears to be*; possibly, if there were any London birdcatchers at work with clap-nets near the Solway, we might hear of the capture of various small species which at present are overlooked.

4. *Icelandic Forms*.—It is reasonable to argue that *Cygnus musicus*, *Bernicla leucopsis*, *Tringa striata*, *T. canutus*, *Calidris arenaria*, *Numenius phæopus*, *Colymbus glacialis*, *Motacilla alba*, and possibly *Plectrophenax nivalis*, *Dafila acuta*, and *Chaulelasmus streperus* visit the Solway Firth from Iceland, and the continents or islands lying north or north-west of Iceland, as their breeding-grounds in several cases must be looked for in Iceland. *Calidris arenaria* sometimes arrives on the sands of the Solway late in May in thousands, though in autumn this species only occurs in small parties on the same foreshores. It is also a winter visitant.

5. *North European Forms*.—Great interest attaches to certain species which appear to visit us from their breeding-grounds in the extreme north of Europe, east of the Varanger Fiord, including *Cygnus bewicki*, *Bernicla brenta*, *Tringa minuta*, *Squatarola helvetica*, *Totanus fuscus*. The last named is not obtained annually on the Solway Firth, but few seasons, if any, pass without its note being recognized. It occurs between August and November, in immature dress. *S. helvetica* often appears on the estuaries in autumn in almost perfect nuptial garb, and full-dressed birds are seen in May. This species appears to be very rare in Western Britain north of the Solway Firth. It has been said that few, if any, Grey Plovers leave England in spring from any point north of the Humber basin; but this is a mistake. The fork of the Solway may act like a funnel, to catch up such individuals as have made their way up the Irish coasts, and desire to migrate in an easterly direction. But this Plover does not occur on the open coast of Cumberland, except as a straggler; it is not until the higher reaches of the Firth are attained that the Grey Plover checks its flight to alight upon the wet sands that it haunts so assiduously. *Tringa minuta* has occurred in every month from August to January, and exceptionally in June; but *September* is the month in which it usually appears, and at that season only young birds have been procured. As for *Cygnus bewicki*, it has occurred as early as October, and as late as April; but is usually met with in winter. Adults largely outnumber the cygnets, for Swans are very long-lived.

6. *Pelagic Birds*.—The wanderings of the various species of *Laridæ* ought, strictly speaking, to be recorded by some seafaring

naturalist. *Larus minutus* occurs in almost every month in the vicinity of the Solway Firth. It has been obtained in January and February, seen in March, shot in April, shot in June; we have no knowledge of its presence in May or July, but it has been reported in August, and obtained in all the four remaining months of the year. We have seen nestlings a few weeks old, before they had lost first plumage; others in the plumage of the first winter; another in its second summer; another in its second winter; as well as (in single cases only) adults obtained locally in full winter and summer garb. *Larus glaucus* has not occurred in quite full plumage, and only in winter. *L. islandicus* has only occurred in immature dress, and that in winter. *Stercorarius pomatorhinus* has generally appeared in October, but once as late as Dec. 22nd. This Arctic bird has never appeared in spring. *S. parasiticus*, on the other hand, has once appeared in spring or early summer; October is the month in which it normally occurs. *Mergulus alle* occurs fairly often between November and February.

ON THE BREEDING HABITS OF THE SWIFT IN DERBYSHIRE.

BY THE REV. F. C. R. JOURDAIN, M.A., M.B.O.U.

ALTHOUGH a widely distributed bird, *Cypselus apus* is difficult to observe at nesting-time, on account of the inaccessibleness of its usual breeding-places. Presumably this is the reason for the uncertainty which exists with regard to one or two points in its history.

The Swift is one of the most regular of our migratory birds, and is usually first seen in this county between May 2nd and 5th. Mr. Storrs Fox has seen one at Bakewell as early as May 1st, but May 4th may be taken as the average date, and it is not at all uncommon for them to arrive exactly on that day. Although they resort to the nest-holes before that time, eggs are seldom found before the last days of May, and about the same numbers seem to return every year. Most nests in this neighbourhood are made under the eaves of lofty buildings or in thatch, but some pairs may be found nesting in the natural crevices of the steep limestone rocks at Dovedale and other places. The Swift can squeeze itself through a remarkably shallow opening, barely wide enough to admit the fingers, and the nests are usually some little way from the entrance. Where suitable sites are available, they seem to prefer to breed in company, but a single pair may often be found nesting at some distance from any colony. For over thirty years a colony of seven to eight pairs has nested under the eaves of a house in this neighbourhood, which stands by itself on a hillside, and offers unusual facilities for observation.

The first thing that strikes one in watching these Swifts is that they play a regular game. On a summer's evening some five or six birds may be in sight, hawking busily in different directions, when suddenly one will dash off towards the house screaming. Every Swift in sight at once joins in the chase,

and the flock race round and round the house, invariably in one direction, passing close to where the nests are, and screaming all the time. The sitting birds squeal in sympathy as the flock dashes past, and, after several complete circuits, the squealing ceases, the flock suddenly disperses, and desultory hawking is resumed, until the signal is again given, and another game is started. Occasionally one sees short chases carried on in the open, but the recognized course is round the house, and the game is repeated time after time on a fine evening. When the birds are laying the eggs often roll out of the nest, especially when Starlings and Sparrows dispute the possession of the holes, and fragments of broken eggs are usually to be found underneath the breeding-place of a colony.

With regard to the number of eggs laid by each hen, there is some difference of opinion. The point is one worth investigation, especially as it has an important bearing upon the question as to the position of the *Cypselidæ*. Mr. Howard Saunders, in the new edition of his 'Manual,' says:—"The eggs . . . are two in number, and when more are found in the same nest they may be the produce of two females." In the same strain, Dr. A. G. Butler writes:—"The number of eggs is normally two; four eggs have been found in one nest, but it has yet to be proved that they were the product of the same hen." On the other hand, Prof. Newton, and many other authors, give the number as two to three, and even four. Lord Lilford says "generally three," and Mr. O. Grabham (Zool. 1898, p. 352), who has found three eggs in Swifts' nests often, even in isolated nests, comes to the conclusion that "the evidence is strongly in favour of the hen-bird by no means infrequently laying three eggs." In some interesting notes on the Swift, by Mr. Steele-Elliott (Zool. 1900, p. 479), is an account of a nest which contained three eggs, and was only observed to be visited by one pair of birds. This is confirmed by a note (p. 556) from Mr. A. Bankes, who observed the same thing for two successive years.

In the colony at Ashburne, to which I have already referred, I have often found nests with three eggs, and on one occasion with four: but of course there was no proof that all the eggs were laid by the same bird, except perhaps the similarity of the eggs in each clutch to one another. This year, by first

ascertaining the number of old birds, and afterwards carefully examining as many nests as possible, I have obtained the following results:—

Number of birds in colony, fourteen. Number of nests, seven (each with sitting bird on June 11th).

1st nest was built on the top of a Sparrow's nest, and contained two incubated eggs, while the remains of a third egg were lying on the ground below.

2nd nest.—Three eggs slightly incubated.

3rd nest.—Three eggs of a very elongated type about half-incubated.

4th nest.—Three eggs much incubated.

5th nest.—Two newly hatched young, and one egg chipping.

The 6th and 7th nests were inaccessible, but a bird was sitting in each.

After carefully marking the eggs from nests 2, 3, and 4, I found that it was quite easy to sort out the clutches without making use of the marks.

Now, even supposing that the hens in nests 6 and 7 were sitting hard on empty nests, and had deposited their two eggs in two other nests (a most improbable supposition), there still remain fifteen eggs as the produce of seven hens; so that at least one hen *must* have laid three eggs.

May we not reasonably infer that the Swift not infrequently lays three eggs, as its alpine relative (*Cypselus melba*) is known to do?

The nests which I have examined consisted of a mass of feathers, a few straws, bud-cases, and blossoms from trees, fastened together with shining glutinous matter into a saucer or shallow cup. In one case this cup was built on to the top of a Sparrow's nest, and another was placed by the side of a Sparrow's nest containing young.

Young Swifts are extraordinarily unlike their parents, but, as they have already been described by White of Selborne and others, it is hardly necessary to do so here. One striking characteristic, which is very noticeable in the embryo, is the large proportionate size of the tibia as compared with the adult. The tarsus and claws are also well developed, while the featherless wings seem very small in proportion to the body. As far as

one could tell, the hind claw in the embryo was opposed to the rest, and not directed forward as in the adult.

When the young leave the nest one or two are generally killed by striking the walls of the house. Sometimes, but more rarely, an old Swift is picked up stunned, but usually recovers after a time. Starlings often take possession of Swifts' nesting-places, but not without having to fight for them, and sometimes Starling and Swift will come headlong to the ground, grappling one another, in which case the Swift generally gets the worst of it.

We do not often see Swifts after the third week in August, and, though an occasional straggler may sometimes be seen as late as Sept. 1st, it is quite exceptional, and for the next eight months their dark forms and cheerful screams are absent from our skies.

PHOTO-TRAPPING: PURPLE HERONS AND SPOONBILLS.

BY R. B. LONGE.

It was in 1896 that I described, in 'The Zoologist,'* a visit to a well-known breeding-place for Spoonbills in North Holland, and I then expressed a desire to spend a week in the attempt to photograph the adult Spoonbills. This wish was gratified, as far as the week goes, in 1897, but, though I exposed two plates on adult Spoonbills on their nest, both plates were found to be fogged and useless on my return home. In the same year I attempted the same birds in a Spanish lagoon, and failed, and I began to think that Spoonbills were not to be photographed. However, in my albums a blank page was left for them, and my determination was fixed to have another attempt. Not until this year has this been possible, and my blank page is now filled to overflowing.

A week was spent in the same "meer," and hopes were fixed on a new automatic electric photo-trap of my own contrivance; but directly I reached the colony I found it was too late to use it, as far as the Spoonbills were concerned. The eggs were hatched, and the half-grown young ones were walking about restlessly, and would certainly have sprung the trap before the arrival of the parent birds. Other methods therefore had to be resorted to, and the electric shutter was released by means of a string on to the switch from a hiding-place the other side of a narrow channel cut in the reeds, from which place, waist deep in water, I also used the tele-photo lens with good effect. Finding that the birds came much more readily than on any previous occasion, I took a whole-plate camera, and hid up with it about seven yards away from the nest, and got my boatman to cover me over with reeds. Here I soon had two splendid chances in a very short time. Once both the old Spoonbills and their three young ones were in front of me; the young birds,

* Zool. 1896, p. 321.

after teasing the old ones for food, would insert their beaks into the parent's throat, and there feed like young Pigeons.

All the adult birds seen had a curious mark on the throat, which, both in shape and colour, gave them the appearance of having their throats cut. I do not mean the orange gorget at the base of the neck, but where the head joins the neck is a mark the colour of dried blood, and just the shape of a gash across the throat with a knife. I do not remember seeing this described.

It was a splendid sight to see these beautiful birds alight at such close quarters, with lowered beak and legs, and a tremendous flapping of great white wings; while the young birds kept up a continuous querulous "chipping," like chickens.

Purple Herons, as usual, were nesting in close proximity, and constantly visited their nests, to an accompaniment of their customary grunts and growls. They too had young, but not far away we found two late nests still containing eggs. Here I tried the photo-trap, but without success, the water being deep and the camera awkward to hide. Another nest was subsequently found better situated, and here we built up a platform of cut sedge and reeds, on which the camera was just raised above the water, and well covered with more sedge and wet water-weeds. A dry-cell battery was hidden with it, and wires carried round to the nest connected with a specially designed switch, on which it was hoped the bird would tread, and so connect the battery, and expose the plate. This was about 10 a.m., and on visiting it in the middle of the day, great was my delight to find the shutter had duly gone off. Looking at the nest, the first impression was that I had been lucky enough to photograph not the Heron, but a Marsh-Harrier in the act of stealing eggs; for four eggs had been left, but we could see but three; the nest was smeared with blood, and a dead reed which formed the lever of the switch was broken short off.

In connection with this state of things, the fact that we had disturbed a Marsh-Harrier from the adjacent reeds as we approached seemed rather significant and suspicious. However, a search revealed the missing egg in the water under the nest, and the conclusion was formed that the Heron herself had ejected the egg, breaking it in doing so, and also snapping off the reed.

Resetting the shutter, and covering all up, the trap was left again until after 6 p.m., when a second visit again found it sprung, and the plate duly exposed; while on a subsequent day—the last one of my stay—she came on again. The first Heron, I think I may safely say, to photograph itself with electricity, but probably not the last.

If this method succeeds with a bird of such extreme shyness and timidity as the Purple Heron, it should prove of great service in obtaining records of birds and animals hitherto impossible. Not only birds at their nest, but any bird or animal,



Ardea purpurea automatically photographed by itself.

large or small, diurnal or nocturnal, which can be attracted by a bait, or which habitually uses the same path or run, can now be photographed. Of course, for nocturnal animals the inclusion in the circuit of a flash-light, to be ignited by the same current which operates on the shutter, is indispensable.

Besides the Purple Heron, the trap was tried at the nests of a Marsh-Harrier and a Great Crested Grebe. These attempts, from the difficulty there was in concealing the camera, were failures.

Before leaving England experiments were made with the trap at a Lapwing's nest, which were successful three times out of four, only so far as that the bird duly went on and released the shutter. This at first was uncovered and rather noisy, and the bird "jumped"; the fourth try, the shutter having been improved and covered in, was entirely successful. The Lapwing, however, this last time sat on the switch for a couple of hours, and completely exhausted the dry battery,—this contingency not having been allowed for. An automatic cut-off has now been made, and, after the release of the shutter, no more battery action can possibly take place, however long the switch is kept pressed down. The shutter, by the way, was made from my designs by Messrs. Dallmeyer, of Newman Street.

THE BIRDS OF GREAT YARMOUTH AND THE NEIGHBOURHOOD.

BY ARTHUR PATTERSON.

(Concluded from p. 105.)

Sterna fluviatilis. Common Tern.—C. This species many years ago nested on Hickling Broad, and on many other parts of the coast, which it has since deserted. It is now most commonly observed leisurely migrating southward in August, following the coast-line in flocks, feeding on the “herring-syle,” which may be seen flashing like myriad streaks of burnished silver at the surface of the water. Occasionally young birds may be seen, resting on the beach, fed by the old ones; three were observed thus tended, Aug. 19th, 1891.

S. macrura. Arctic Tern.—F. C. My experience of this species is, that it is in some years almost as plentiful as the preceding species. It follows the coast-line also in autumn, and in company with *S. fluviatilis*. Was unusually abundant in this neighbourhood in August, 1881, when many were killed. When on the wing, fishing, it is difficult, of course, to distinguish from the Common Tern.

S. minuta. Little Tern.—N. U. Said to have formerly nested at Hickling, but had become rare in this county at that period, and has now quite deserted the Yarmouth district. It is occasionally seen on Breydon in autumn. Plentiful on Breydon, Aug. 1881. I saw several, Aug. 1900. It is a charming little creature, whose loveliness alone should ensure its immunity from destruction.

Xema sabinii. Sabine's Gull.—A. Two obtained on Breydon, immature male and female, Oct. 17th and 21st, 1881. A young male “consorting with Lapwings” was shot at Hickling, Oct. 6th, 1889 (Norf. and Nor. Nat. Soc.).

Larus minutus. Little Gull.—R. R. May be looked for after severe north-westerly gales. Was, prior to February, 1870, considered a very rare species: in that month a tremendous

easterly gale blew a whole flock to the east coast. Over sixty were killed in Norfolk, the majority adults (Norf. and Nor. Nat. Soc. vol. iv. p. 410). A beautiful black-headed adult was shot at Hickling, April 2nd, 1888 (Connop Catalogue).

L. ridibundus. Black-headed Gull.—C. This species breeds plentifully in the Broad district, and is common at Yarmouth at all times of the year, becoming numerous on the mud-flats and at the harbour mouth in autumn. During severe weather flocks are seen hunting for floating edibles on the river in the heart of the town. Protracted frosts make them remarkably tame, when they swarm on the town refuse-heaps, and are easily decoyed into a net. A birdcatcher, in December, 1890, caught one hundred and thirty-seven in three days with a clap-net on the North Denes. Fifty-six were taken at one pull. The same bird-catcher captured fifty-three out of a flock on Feb. 11th, 1895. On Nov. 27th, 1895, hundreds were attracted to a field at Browston, near Yarmouth, manured with herring refuse, most of which they devoured. Local, "Kitty."

L. melanocephalus. Mediterranean Black-headed Gull.—A. An adult male was shot on Breydon, Dec. 26th, 1886; the first example recorded as met with in the British Isles. The wind was south-west on the day it was shot, and north-west the day before. It was identified by Mr. G. Smith, in whose possession it still remains.

L. canus. Common Gull.—C. Frequent on Breydon in all stages of plumage. More commonly seen off shore during rough weather, generally flying shoulder to wind. Local, "Sea Cob."

L. argentatus. Herring-Gull.—C. Common in late autumn, when fine adult birds may be observed leading the beach, north or south, according to the winds. Numbers on Breydon, Nov. 1900.

L. cachinnans. Mediterranean Herring Gull.—A. A male of this species shot on Breydon, Nov. 4th, 1886. The first recorded British example (Norf. and Nor. Nat. Soc. vol. vi. p. 417).

L. fuscus. Lesser Black-backed Gull.—C. Common, more especially in immature plumage.

L. marinus. Greater Black-backed Gull.—C. Common on Breydon all the year round. A considerable number there all

through the summer, mostly immature, with a few adult non-breeders. Blotched individuals, assuming the mantle, not unfrequently seen. Birds of the year (*local*, "Grey" Gulls) numerous during herring fishing and in winter along the shore, at which time there is in the early morning a movement southward, and again at eventide, northwards.

L. glaucus. Glaucous Gull.—N. U. A regular "hard-weather" species. Numbers brought in by fishing-smacks, Jan. 1881; I know of twenty-seven offered for sale in one lot, of which seven were fine adult birds. Several have been killed in the neighbourhood, odd birds being met with in ordinary winters. Example killed at Caister, Feb. 1899.

L. leucopterus. Iceland Gull.—R. An example killed in Nov. 1852 (B. of S.). A second obtained at Caister in Nov. 1874. Two others at Yarmouth and Scratby, respectively, Dec. 6th and Dec. 28th, 1892. I saw, and crept to within a few yards of, one near Breydon walls on Jan. 14th, 1899; it was subsequently shot. On May 3rd, 1899, I observed a white Gull, which I believed at the time to belong to this species. It remained with other Gulls two or three days, and was unmolested; but was afterwards shot, and identified as a variety of *Larus canus*.

Rissa tridactyla. Kittiwake Gull.—F. C. A peculiarly marine species, spending much time far out at sea. Is well known to the herring fishers. It inshores in stormy weather, and appears sometimes to perish in heavy gales, after which I have occasionally picked up several. On Feb. 16th, 1890, I found no fewer than thirty, with sixteen dead Razorbills at intervals, in a walk along the beach. It may be identified at sea by its erratic flight. Is not so common locally as formerly.

Stercorarius catarrhactes. Great Skua.—R. R. A rare bird on our coasts. Messrs. Paget state that four were shot in the Roads, Oct. 7th, 1827. Mr. Stevenson enumerates several for Yarmouth (B. of N. vol. iii. p. 346). One at Yarmouth, Oct. 3rd, 1881.

S. pomatorhinus. Pomatorhine Skua.—R. R. This species is the most frequent of the Skuas on the east coast of Norfolk. Several have been recorded during the century during gales, chiefly in October. Many were met with in 1874; after a heavy gale on Oct. 20th, "one game-dealer had thirty Skuas at one

time, probably nearly all Pomatorhine" (B. of N. vol. iii. p. 350). A large migration in 1879, which Stevenson calls "the great ornithological feature" of that year. Several seen and obtained, Oct. 1881. I found the remains of one on the beach in Nov. 1892. Local, "Shyte-awk," "Boatswain," and "Molberry."

S. crepidatus. Richardson's Skua.—R. R. Messrs. Paget say that "both this, and its young, the Black-toed Gull, have occasionally been shot." Most are immature birds.

S. parasiticus. Buffon's Skua.—R. R. An occasional visitant. Stevenson (B. of N.) records several local examples. A fine male specimen was shot on Breydon in Oct. 1890, which on being placed on the floor of the punt vomited several live earthworms.

Alca torda. Razorbill.—C. Not uncommon in the Roads during the autumnal herring fishery. In my younger rambling days I observed that drowned examples were frequently washed ashore after continuous easterly gales. Of late years it has become comparatively rare, its place being taken by the Guillemot, which then was not so commonly stranded. Local, "Wil-duck."

Uria troile. Common Guillemot.—C. Occasionally abundant in the Roads; also on the herring fishing-grounds. Have known it hooked from the piers by amateur fishermen, by whose baits it has been attracted, and have obtained specimens that have been entangled in the meshes of 'longshore drift-nets. I have frequently seen dead or exhausted birds toppled ashore during easterly winds. My attempts to rear several have always failed; indeed, healthy birds, incarcerated in aviaries, seldom live for any length of time. I have occasionally met with the ringed or bridled variety. Local, "Wil-duck."

U. grylle. Black Guillemot.—A. Two recorded for Yarmouth (B. of N. vol. iii. p. 280). The first was picked up on the beach at Caister; the second shot in the winter of 1878-9.

Mergulus alle. Little Auk.—N. U. "Occasionally shot in Roads" (Paget). Is looked upon as a mere straggler, although it has been occasionally "struck" by severe gales, when numbers have been washed ashore or blown inland. An unusual fatality occurred in January, 1895. Three hundred and two were recorded for the county. I picked up two or three at the sea-line,

but Yarmouth did not share in this visitation to the same extent as Blakeney and Wells in north Norfolk.

Fratercula arctica. Puffin.—R. R. Not a common bird on the Norfolk coast. "Some have been seen by Mr. Southwell on Yarmouth Roads in summer. . . . They are not (however) nearly so common as might be expected," considering the nearness of Flamborough Head, a favourite nesting-place of the species (Norf. and Nor. Nat. Soc. vol. iv. p. 415). I have rarely picked up dead examples on the beach. Local, "Sea-parrot."

Colymbus glacialis. Great Northern Diver.—R. R. Messrs. Paget observe that specimens of this bird were "occasionally shot on Breydon; the young bird is more common." This description holds good to-day, but it is always scarce, and the adult in summer plumage has never been obtained in Norfolk.

C. adamsi. White-billed Diver.—A. An example in winter plumage obtained at Lowestoft in 1852. Mr. E. T. Booth shot a specimen on Hickling Broad in December, 1872 (Norf. and Nor. Nat. Soc.).

C. arcticus. Black-throated Diver.—R. An unusual winter visitor. Three or four recorded for Breydon and neighbourhood, two of them in March, 1871, another in November, 1880. The immature bird may be not seldom mistaken for that of the red-throated species, but is larger, and has a whiter neck.

C. septentrionalis. Red-throated Diver.—F. C. Our commonest Diver. Messrs. Paget record it as "common on Breydon." It is now only occasionally observed there, but is often seen off the beach, generally in late autumn. Mr. E. T. Booth observed hundreds during the last week of October, 1872, in close proximity to the herring-fleet outside the Cross Sands. One with full red throat shot, Sept. 15th, 1897. Local, "Spratloon."

Podiceps cristatus. Great Crested Grebe.—C. At one time this beautiful bird was becoming scarce on the Broads owing to the demand for its breast feathers. It has now, however, once more, thanks to careful preservation, become fairly common. I have observed it in mid-winter off shore, but its return to Fritton Lake is not until March, or when the frost breaks up. In June, 1896, one was hooked on Ormesby Broad.

P. griseigena. Red-necked Grebe.—R. "Three shot in

January, 1828 " (Paget). Have occasionally met with it in winter on sale in the market. Three more shot, Jan. 9th, 1891, when the migration extended to other parts of the east coast; and others in the great migration of 1865.

P. auritus. Slavonian Grebe.—N. U. I know of no local occurrence in the full summer plumage, but it is not seldom brought to market in winter. Immature examples have been met with on Breydon.

P. nigricollis. Eared Grebe.—R. Rarely shot on Breydon or the Broads in Messrs. Paget's time, but several are recorded in the 'Birds of Norfolk,' mostly in spring. Has probably nested on the Broads. An example shot in this neighbourhood, Oct. 7th, 1899.

P. fluviatilis. Little Grebe.—C. More frequently observed and shot in late autumn and winter. During severe weather takes to the lower reaches of the rivers and Breydon. Several there, December, 1899. Six brought to market on Dec. 16th, 1899. Probably migratory additions from more northerly counties before sharp frosts. Local, "Dob-chick."

Fulmarus glacialis. Fulmar.—R. R. Generally met with in winter. Has been occasionally brought in by fishermen. I have picked up dead examples on the beach, which I incline to think have been thrown out of the herring-nets. "Occasionally shot or caught in the Roads" (Paget). Less frequent of late years (B. of N. vol. iii. p. 374). Mr. Gurney has a barbed fish-hook, $2\frac{1}{2}$ inches long, with 28 inches of twisted cord, which was taken out of a Fulmar Petrel caught off Yarmouth in November, 1885.

Puffinus major. Great Shearwater. — A. An example was picked up on Caister beach on Dec. 22nd, 1892; and another was shot, in November, 1898, at Lowestoft.

P. anglorum. Manx Shearwater. — A. Very rare. Mr. Lowne had one from Breydon, Sept. 4th, 1883. Another procured there, Sept. 15th, 1891.

Oceanodroma leucorhoa. Fork-tailed Petrel.—R. R. Messrs. Paget mention "a specimen found on the beach, Dec. 5th, 1823." Several have been recorded since. It has generally occurred in rough weather. One shot on the beach, Jan. 6th, 1891; and another taken alive in the town, Oct. 8th, 1898.

Procellaria pelagica. Storm-Petrel. — L. L. In the days (prior to 1876) when herring-luggers landed their catches on the beach, in the huge "carrier" boats, and when much refuse was thrown overboard, this Petrel was common, hundreds at times visiting the neighbourhood. The fishermen amused themselves by knocking them down with osier wands as they followed the herring-milts trailed behind the boats on pieces of string. In November, 1824, between two and three hundred, according to Messrs. Paget, were shot after a severe gale. Mr. E. T. Booth mentions seeing numbers off shore on November, 1872. It is now seldom seen except in exceptionally severe and continued gales. Mr. J. H. Gurney received one from Winterton Light-house on Dec. 9th, 1899.

SLOUGHING IN SERPENTS.

BY GERALD LEIGHTON, M.D.

THE process, common to all reptiles, of periodically casting off a "slough" is a very interesting one to watch, and can best be observed in serpents. It is not often the good fortune of the observer to be able to see it in natural conditions, though I have encountered several Adders engaged in the act; but in serpents in captivity the whole process can be studied with ease and accuracy. In books which touch on the subject three statements are to be found, which, in my experience, are inaccurate, or at any rate only partially true. It is said, in the first place, that the slough is cast once every year; secondly, that the reptile often makes a meal of the cast-off slough; and, thirdly, that the slough is cast entire (*i. e.* in one piece) when the reptile is in good health, but in several pieces if the animal is out of condition. It is quite possible that various species exhibit individual peculiarities in this matter, but in the case of British reptiles none of these statements are quite accurate. In the first place, it is usual for both Adders and Ring-Snakes to cast their sloughs three, four, or even five times in a season. The first sloughing takes place immediately after the winter hibernation is over, and the process is repeated at intervals of six weeks or two months. The same remark applies to the Slowworm (*Anguis fragilis*). Secondly, I doubt whether any one of the three species mentioned ever swallows the cast-off slough—at any rate, those I have kept have never done so. It is no doubt true that some amphibians do this, and probably this accounts for the idea that serpents act in a similar manner. The third point is perhaps the most interesting, and it is that to which I wish specially to draw attention in this paper. What determines whether the slough comes off whole or in pieces? To answer this question it is necessary to understand the nature of the process. There are two distinct stages in the act of sloughing.

The first is an active *physiological process* on the part of the serpent, as the result of which the external covering is separated from the true skin. Prof. Packard describes this separation as being due to the growth of fine temporary cuticular hairs. Thus loosened, the slough rapidly becomes dry, and is ready to be cast off. The second stage, or the casting off, is a *mechanical process*, by which the serpent endeavours to rid itself of what is now no longer a part of its anatomy. This is effected by continuous rubbing against any convenient surface, the side of the cage in the case of captive snakes. The result of this rubbing, as far as the slough is concerned, depends, in my opinion, on the simple factor of whether the serpent is in a position to rub off both sides of the slough evenly—that is to say, if the reptile can get pressure evenly exerted on both sides of the body—by creeping through grass, or in some other way—the slough will peel off whole, being turned inside out in the process; but if, on the other hand, any projecting point should come in contact with one side of the slough, the latter, being very delicate, will be torn, and the slough cast in pieces. In very young, and therefore small snakes, the slough comes off very readily, and generally entire; but in older and larger specimens I have found it the exception rather than the rule for this to occur, and the slough is usually in pieces. This is quite independent of the state of health of the snake, a matter which is, moreover, somewhat difficult of diagnosis, unless the reptile is suffering from canker. I have made a point of observing this sloughing in reptiles in various zoological collections, and invariably have seen the sloughs of the larger serpents in pieces in the cages. Anyone can observe it at the Zoo. It is particularly noticeable in the Pythons; and I now append a series of notes made by Mr. W. J. Clarke, of Scarborough, on the frequency and character of the sloughings of one of his Pythons:—

Python molurus.—Sloughing in confinement (W. J. Clarke, Scarborough).

“I received the Python on Sept. 7th, 1897. Three weeks later I found one morning that it had shed its slough, but, not expecting this, made no notes. Python now measured $6\frac{1}{2}$ ft.

“1. On Nov. 20th, 1897, at 7 p.m., Python entered the water in its zinc bath. Remained there continuously till 11 p.m. on

Nov. 26th, when it shed slough in two large pieces in the water, and then left the bath.

"2. On Jan. 6th, 1898, at 3 p.m., Python entered water, and remained till 3 p.m. on Jan. 13th, when it cast slough in several pieces, and then left water.

"3. On Aug. 10th, 1898, Python again entered bath; remained without any intermission till 11.30 p.m. on Aug. 19th, when it left the water. At 11.40 it commenced rubbing its head forcibly on the felt which lines its case, frequently turning its head sideways to exert pressure upon the side of the jaws. When it had got as far as the nostril it gave two sudden and forcible expirations—not an ordinary hiss, but more like a sneeze, apparently to clear the loose skin from the inside of the nostrils; at all events it had this effect; then continued rubbing off the slough. At 11.48 the slough was completely free from the head above and below. At 11.52 I removed the bath out of the cage, as it seemed to have too little space. On being thus disturbed it ceased rubbing till 12.10, when it commenced to crawl slowly round the cage, pressing itself closely into the corners and along the sides. By 12.37 it had turned back two feet of slough, and at 1 a.m. three feet. At 1.30 a.m. the tip of its tail came away from the slough, which on this occasion was shed entire, but with one or two rents in it. During the last half-hour I assisted the process by allowing the Python to crawl through my partially closed hands.

"4. On Nov. 6th, 1898, Python entered water. Remained continuously till 24th, when it cast slough during the night.

"5. On Feb. 16th, 1899, Python appeared soon likely to slough, so I introduced its bath. It entered at once, but only remained a few hours, and kept on entering and leaving the bath until Feb. 25th, when sloughing commenced. As the slough was dry it did not readily peel off, and the process was only partially completed. The Python then entered the water, and remained till Feb. 28th, when it emerged and cast the rest of the slough. (On Feb. 27th it was observed to remain under water for seven and a half minutes once without raising its head for breath.)

"6. On July 18th, 1899, Python entered water, and stayed till July 28th, when it cast slough in water. The actual

sloughing occupied one hour. (Cast whole, with many rents in it.)

"7. On Oct. 12th, 1899, Python entered water, and stayed till Oct. 26th, when it left water, and cast slough in several pieces.

"8. On Dec. 30th, 1899, Python entered water, and on Jan. 1st, 1900, cast slough in water in many small pieces.

"9. On March 24th, 1900, Python showed signs of sickening for sloughing, but refused to enter water. It tried to slough on April 2nd, but could only get off the scales on the belly. I accordingly fastened the Snake in the bath, where the rest of the slough came away on April 5th.

"10. On May 21st, 1900, Python entered water, staying till May 28th, when it left water, and cast slough in three large pieces.

"11. On Aug. 23rd, 1900, Python entered bath, stayed till Aug. 31st, when slough was cast in two pieces in the water.

"12. On Nov. 15th, 1900, Python entered water, stayed until Nov. 25th, casting slough in water in four pieces. The Python now measures just under $8\frac{1}{2}$ ft. in length."

The foregoing admirably careful observations by Mr. Clarke show that his Python sloughed twelve times in three years, usually casting the slough in pieces, though in good condition. The term "sickening for sloughing" means the symptoms seen a few days beforehand, *viz.* roughness and darkening of the skin, refusal to take food, disinclination to move, and dimness of the eyes.

NOTES ON THE EGYPTIAN JERBOA (*DIPUS JACULUS*) IN CAPTIVITY.

BY GRAHAM RENSHAW, M.B.

THE immense number of species of animals which are now kept as pets almost defies enumeration, and it is difficult indeed to select for special notice any single animal; for all the others compete with it in claiming the attention of those zoologists to whom mammal or bird, reptile or fish, is more attractive in the living state than as a stuffed skin or mounted skeleton in a museum case. The furred and feathered captives of to-day range from the schoolboy's Rabbits and White Mice, Pigeons and Canaries, to the Burchell Zebras and White-tailed Gnus, the Kangaroos and Emus of wealthy acclimatisation societies; and half-way between these extremes one may place various "out-of-the-way" pets—by no means ordinary domestic animals, yet also by no means unobtainable—such small specimens as Armadillos, Agoutis, Phalangiers, and Wallabies.

Amongst this assemblage of "out-of-the-way" pets is included a pretty little rodent rapidly and deservedly advancing in popularity—the Egyptian Jerboa (*Dipus jaculus*). Not only does its tiny form interest the scientific naturalist, with its quaint little body perched on an absurd pair of stilt-like legs whose disproportionate size contrasts strangely with the almost microscopic proportions of the fore limbs; but its beaming eye, vivacious manners, and odd bird-like gait (now running like a Rail, and now hopping like a Sparrow) endear it also to the general public. Having for some considerable time possessed examples of the Egyptian Jerboa, I have had many opportunities for studying their behaviour in captivity, and perhaps the collected results of the observations may interest others besides myself.

The Egyptian Jerboa measures about $14\frac{3}{4}$ in. from the snout to the tip of the tail, exclusive of the terminal tuft of hair. The

colour varies somewhat: in large well-grown specimens it is sandy, but I have noticed that in small Jerboas it may have a distinct greyish tinge. The tail is brownish, tipped with black and white.

When standing "at ease" the Jerboa uses its tail as a kind of third leg, this tripod arrangement recalling similar habits practised by other mammals widely differing from the Jerboa—such as Kangaroos or Wallabies, and perhaps also the huge extinct *Megatherium* of South America. The Jerboa presses its tiny fore legs close to the chest, and the body projects forwards. When moving this little animal employs one of two gaits: (1) a quick run, each leg being moved alternately; and (2) a series of tremendous leaps, the long tail being held out straight behind, as if to counterbalance the forwardly directed head and body. I well remember a fine male, which I still possess, escaping from his prison, and the great rapidity with which he bounced along over a wide lawn, as if made of animated india-rubber, the tiny fugitive progressing at a lightning speed that rendered pursuit hopeless. His final recapture was effected by strategy.

Jerboas are usually stated to be nocturnal; so no doubt they are to a large extent, but by no means entirely so. They are at any rate also crepuscular, if not diurnal, my own animals being lively at all hours, retiring to rest irregularly for a longer or shorter interval. When asleep they repose either huddled up in a furry ball (head tucked in and tail coiled round them), or else lying on one side. The latter position was rather horrifying at first, suggesting that the Jerboa had departed this life; however, a dead Jerboa either lies flaccid with limbs extended, or else rolls over on its back, the long legs sticking up in the air. These animals are lethargic in wet and foggy weather, and sleep much later in the day than when it is dry and warm. On rousing up for the evening the Jerboa frequently opens its eyes, and remains motionless in a dozing semi-somnolent condition for perhaps half an hour or an hour before becoming fully active. It then begins to clean itself with great care, smoothing its fur, and paying special attention to the terminal tuft of the tail, the hair of which is absurdly parted down the middle in the neatest possible manner. The Jerboa also frequently stretches itself in the most amazing fashion, extending itself to the utmost, so that,

as it lies on its side, the long hind legs form almost a straight line with the body. The next instant the little contortionist flexes its body, the long legs projecting in front of its muzzle as rigidly as a moment before they were extended backwards. Food is the next consideration: the Jerboa begins to run about with remarkable nimbleness and lightness, like some wee brown gnome or "brownie" (*literally*, a "brownie"), ever and again abruptly stopping to examine some object. Oats, corn, millet-seed—any dry food is welcomed, the grains of food being clasped in the tiny fore paws, and conveyed to the mouth in true rodent fashion. Green-stuff is also taken freely. Although probably, like the Giraffe, the Eland, and the Gemsbok, the Jerboa has often, in its own African deserts, to go without water for long periods, it drinks freely when it has the opportunity, and I have frequently seen my own animals drink, scooping up the water with the fore paws, and conveying it to the mouth so quickly that at first glance the animal seems to be lapping the water like a Dog.

Jerboas are very playful: if their cage is carpeted with sand, they will stretch themselves on it with great glee, and attempt to burrow in it, ploughing up the sand with their muzzles. They also have a mischievous habit of nibbling woodwork, and on one occasion a pair of these animals utterly ruined a small bird-cage given to them for a sleeping apartment by demolishing both floor and back, an enormous hole being gnawed in each. One Jerboa, indeed, which was recently addressed to me, I never got, for in transit the industrious prisoner nibbled his way out to freedom, doubtless to the astonishment of the railway officials. Twigs and branches with the bark on are quickly stripped bare; in this respect these rodents are fully as destructive as Budgerigars or Parrots. Jerboas climb well, running quickly up wire-netting, and jumping off recklessly on to the floor from a considerable height; I once lost a nice female from a compound fracture of the leg, supposed to have been caused by this habit. She persisted even after the limb was broken in scrambling up the wires on one leg, and did not die for at least a week after the injury, eating and sleeping well in the interval. Jerboas are very tough; the male I now possess once fell through a hole in the floor of a loft upon the concrete pavement of the room below, from a

height sufficient to have seriously injured, if not killed, a human being. Nevertheless, though his muzzle was covered with blood when I picked him up, causing very laboured respiration for some time after, on revisiting him about three hours later he had already recovered, and was as active and lively as before. This is the more remarkable, as a female which was killed by accident died in three minutes, the skull cracking like an egg-shell, and the animal being convulsed all down one side.

Solitary Jerboas remain silent for weeks together, but a pair during courtship repeatedly utter a curious croaking noise, sitting facing each other with their depressed muzzles in contact. I have not yet succeeded in breeding these little animals.

The above are the results of observations conducted during the past ten months on captive animals, well-fed and well-housed, with abundance of room for exercise, and good bedding. The list of specimens is as follows:—

(1) Adult female, purchased November, 1900.—At first lively and feeding well, this Jerboa soon became somnolent and stupid, probably owing to the continued damp weather, with almost total absence of sun. It uttered no sound, and was very gentle, never attempting to bite. This Jerboa died in the winter of 1900-1.

(2, 3) Adult male and female; a fine well-grown pair, purchased Jan. 14th, 1901.—The male (still living) was a remarkably fine animal, always more active and more easily roused than the female, who, I think, must have been an old animal, as her partner paid her little attention. The male was a public character, who achieved considerable notoriety; for, having been taken to exhibit at a local bazaar, he distinguished himself by escaping from his custodian, and remained triumphantly behind the wainscoting of an adjacent chapel for about an hour and a half, scraping with provoking and very audible diligence at the mortar of the wall. After several fruitless attempts he was recaptured, and again figured in public, to the great benefit of the funds, very many persons coming to see the wonderful "Rat on stilts." Both animals delighted to gnaw holes in an old curtain, to which they had access, and burrowed amongst its folds with infantine delight.

(4) A young female, successor to No. 3.—The male was much attached to this animal, paying her much attention. Unfortunately

she died as a result of a broken leg, probably received in falling a considerable height from the sides of the cage. She was of a remarkably lively and frolicsome disposition, pattering about over the floor of the cage with the nimbleness of a Sandpiper.

(5) A young female.—Very small and poorly coloured; a remarkable greyish tinge showing on the fur.

(6) Adult female (successor to No. 4).—A handsomely marked specimen, rich dark fur in contrast to No. 5. The male seemed to like her well enough. It was hoped the pair would have bred. Unfortunately she was found dead one morning, though apparently in perfect health the day before. No cause of death was assignable. The male has survived all his wives, and is as lively as ever.

In concluding this article, I cordially recommend the Egyptian Jerboa to any naturalist in want of an out-of-the-way pet. Of convenient size, gentle disposition, engaging manners, and quaint shape, this little animal can be obtained at a very moderate price (say from four to seven shillings) of many London dealers, and is easily kept on crushed oats, millet-seed, or similar dry food. It does not require artificial heat save in the bitterest weather, provided it be kept indoors; it is neither delicate like a Marmoset, uncertain like a Ferret, noisy like a Cockatoo, nor vicious like a Budgerigar. Let the Jerboa have its food and cage perfectly dry, damp and especially fog being carefully avoided; see that the drinking-vessel is accessible, and give the animal plenty of clean dry hay, from which it will itself gnaw fragments to form its diurnal couch, and *Dipus jaculus* will live long and happily to delight the heart of its owner with its odd ways, lively movements, and docile temperament—a rodent Kangaroo, a mammalian Sparrow, and a vertebrate Sandhopper all rolled into one.

OBITUARY.

ELEANOR A. ORMEROD.

By the death of Miss Ormerod there has passed away a notable Englishwoman. She was not only recognized as a naturalist—being an entomologist of no inconsiderable attainment—but she was distinguished in the higher sense of rendering her science a practical value for the good of humanity. We know in many cases the absolute impossibility of bringing zoology into the domain of our national economy; we also clearly see the advisability of not seeking to do so on insufficient grounds; but it was the great work in the life of Miss Ormerod that she made her favourite science a blessing to the community. Unendowed, except by her singleness of purpose, she took up a work which appertains to a non-existent governmental department, and cheerfully devoted her talent and much of her means to the service of the agricultural and trading community. That this is no hyperbole, and that entomology may be made a factor in the welfare of our commercial life, is proved by the notices of her death in papers which have reached us, not only such as represent the agricultural interest, but others bearing such names as ‘Mark Lane Express,’ ‘Meat Trades Journal,’ ‘Boot and Shoe Trades Journal,’ &c. She may be said to have consecrated the study of insects in the economic and commercial instincts of our national life.

The lady who thus brought natural history to the aid of the democracy was well-born and carefully nurtured. She was the third and youngest daughter of the late George Ormerod, D.C.L., F.R.S., &c., the author of the ‘History of Cheshire,’ who belonged to the Lancashire branch of the Ormerods of Ormerod. Her mother was the eldest daughter of John Latham, M.D., F.R.S., Fellow and sometime President of the Royal College of Physicians. She may thus be said to trace her parentage from an aristocracy of intellect. Born on May 11th, 1828, she had

reached an age of seventy-three years. As a woman, Miss Ormerod maintained the potentialities of her sex by being the first lady member admitted as a Fellow of the Royal Meteorological Society, and we believe also of the Entomological Society; while she still further carried the standard by being the recipient of the degree of LL.D. of the University of Edinburgh, for the first time a female distinction in the Scottish capital.

It is, however, in her twenty-four Annual Reports that the work done can be properly estimated. Farmers, agriculturists, and others recognized her as the authority to whom to apply for advice as to combating, if not overcoming, the plagues of noxious insects. An entomologist reading these Reports in a purely technical spirit might sometimes mutter "compilation," but this they never were, except in the sense that the sum of all human knowledge is a compilation. As a real student, she sought the best authorities; as an honest woman, acknowledged the sources from which she had obtained her information, and there that matter ended; her advice as to practical endeavour was her own, based on a wide experience, and in this sense compilation might as easily be charged against every historian. To know what has been done is the object of the publication of our annual 'Zoological Record,' and to have little knowledge of it is the weakness of weak zoologists.

The death of Miss Ormerod and the termination of her gratuitous services raises the whole question as to whether the time has not arrived for the appointment of a governmental bureau, where these matters—of vital interest to agriculture—should be entirely dealt with. America has long led the way in this enterprise, and we may eventually live to see entomology recognized as one of the most beneficent sciences. When this takes place the name of Miss Ormerod will be remembered as that of the pioneer of the movement, and as one who approached her subject with the grip of a man and the love of a woman.

Another writer who had most intimate relations with the deceased will now add some personal recollections.

(ED.)

It has been thought curious that a lady should take up agricultural entomology, and not only dabble in the science, but practically make it her own, as Miss Ormerod has done, so far as this country is concerned. The beginning was undoubtedly example and precept. Dr. George Ormerod, as well as his brothers and ancestors, had been acute observers and practical workers in various fields of science; the same may be said of his wife and of her forbears. Observation of the habits of insects with patient interest was one of Miss Ormerod's earliest recollections. With her, interest was centred in life and habit, not in the making of collections.

As she grew to womanhood the duty fell to her of overseeing the farm and park-lands constituting her father's estate at Sedbury, on the Wye. The recollection of the beauty of Sedbury Park was a constant pleasure; and perhaps there was in it something of a family pride. She seems to have assumed practical management in every branch, and to have entirely won the confidence of those under her orders. She acquired a working knowledge of agriculture, made more thorough and accurate by the habit of intelligent, painstaking observation of little things in early years. Thus was entomology united to agriculture. Opportunity was abundant for observing insect depredation and experimenting for remedy, and the habit was formed of investigating life-history with a view to discovering the vulnerable point of attack, and of seeking hidden causes for visible effects. She became the counsellor of those under her at home, and it was an easy and natural transition to counsel practical farmers farther afield as help was sought.

At her father's death, she and her sister removed to Isleworth, where, in 1877, she determined to publish a few Notes of Observations on Injurious Insects; this was given to numerous correspondents, and was followed next year by a Report of the attacks of the year, with free quotation (carefully acknowledged) from those who had enquired and experimented with remedies. The Reports became Annual, grew in bulk and authority, and soon determined what was to be Miss Ormerod's future life-work.

It was no *dilettante* work, but involved concentrated application and energy. On various occasions an amanuensis was tried, but unsuccessfully; the only help in correspondence and

editorship until the closing years was that of the dearly loved sister, so gifted as an artist—her other self—who died in 1896, and whose death cut away one-half of the light of the life that was left.

With Miss Ormerod correspondence was not perfunctory or official. Extreme and dignified courtesy—perhaps it would be called old-fashioned courtesy—marked her every action and word. Every enquiry (and many were concerning attacks already treated of in the published Reports again and again) would receive full and detailed reply. When on one occasion advised to minimise labour by enclosing a printed account of the remedy, “with Miss Ormerod’s compliments,” she derided the suggestion—it was not in that manner that her connection had been built up.

On the subject of payment she was very sensitive: payment would be tendered her for official duties, for evidence in law cases; but she would have none of it. Her publications, besides taking time, must have been a considerable item in annual expenditure; they were given to all who had helped her in however small a degree, as well as to scientific colleagues in this and other countries. “If my correspondents thought I was making money out of them, do you think they would continue to help me?” she would ask. Her leaflets upon special subjects were given away by hundreds of thousands, with hearty thanks to those helpers who would intelligently distribute them.

Fourteen years since, during return, somewhat overwrought, from an official meeting, a street accident occasioned an injury which was followed by lameness and almost constant physical suffering. She was never in strong health, and this was a shock to the whole system. “Sometimes,” she said, “I lie awake at night wondering whether I can live through the pain until the morning.” She not only lived through it, but bravely worked through it day after day, that the farmers whose interests were so near her heart might not suffer from her neglect.

Miss Ormerod valued the honours that were bestowed upon her by scientific societies; but the reason for appending them all on her title-pages was not vain-glory, but lest any should feel hurt by being omitted. She greatly appreciated being elected the first lady member of a learned Society; but what was felt to be the great honour of her life was the conferring upon her by

Edinburgh University of its LL.D. degree. She received numerous medals of honour in recognition of her services to science, and amongst them perhaps those most esteemed were that of the Société d'Acclimatation of France, and the gold medal of the University of Moscow. There is something tangible about a medal; it can be shown to interested friends, and incidents connected are recalled and related. Towards the close, as a consequence of the special illness, there were times of depression, when fears came that she was forgotten, and her life's work had been of no avail. On one of these occasions the sight of the collection of medals with their inscriptions served as a distinct restorative to a more cheerful view of life.

"There's a many will miss her; she was a good woman," said one of her working-men neighbours. Her kindness and courtesy to those about and around her have bound her to them in affectionate regard.

(T. P. N.)

NOTES AND QUERIES.

MAMMALIA.

CHIROPTERA.

The Whiskered Bat in Oxfordshire.—A Whiskered Bat (*Vespertilio mystacinus*) flew into one of the rooms here on the night of July 19th last. For several nights numbers of moths had been flying into the room, attracted by the lamp, and numbers of others were continually fluttering about outside. On several occasions I noticed two or three Bats flying backwards and forwards just outside the window, apparently in pursuit of the moths. Probably the Whiskered Bat was one of them. This Bat has been recorded from Godstow, near Oxford, but I had not previously met with it in the north of the county. Mr. Oldfield Thomas kindly confirmed my identification of the specimen.—O. V. APLIN (Bloxham, Oxon).

Bats carrying their Young.—On Sunday afternoon, the 7th July, a young Bat fell out of its home above our hall-door porch, and lay on the steps until evening. I placed it in a cardboard-box beside me, where it remained feebly squeaking as I sat with three other members of our family at dusk, when the elder Bats began to come out. They soon discerned the lost young one, and six or eight of them flew round and round us so closely that I turned it out on the gravel-walk about a yard from where I sat, when they continued to hover round it very closely. Anxious to witness its removal if possible, I placed it a little farther from us, and after more indecision one of the Bats alighted on the ground, and spread itself over the young one. I then covered it with a butterfly-net, and afterwards with a glass case, but, finding it did not move, I examined it without any covering for some minutes. Thinking it could not carry but intended to stay with the young one, I gently touched it, when it flew with its treasure into the shelter of a neighbouring group of trees.—R. M. SKIPWORTH (Owmbly Mount, Searby, Lincoln).

AVES.

Lesser Redpoll nesting in Sussex.—On May 4th, 1901, a nest of the Lesser Redpoll (*Linota rufescens*) was found by Mr. Arthur Byatt, of Midhurst, Sussex, in a small fir-tree, about fifty or sixty yards

from the river Rother, at a height of from twelve to fifteen feet from the ground. When found it contained three eggs, of which one was taken at the time. The birds were watched and identified, and it was intended, when the full clutch of eggs had been laid, to take them, substituting small eggs of the Linnet for the Redpoll to hatch out, and then subsequently, when the birds had flown, to remove the nest for preservation. But on visiting it a week later (for the purpose of substituting Linnets' eggs as mentioned), the remaining two eggs were gone, as was also the lining of the nest, which consisted of vegetable down. There was no evidence of broken eggs anywhere on or around the tree, no signs of other visitants, and a Thrush's nest in the adjacent tree, low down and hard to overlook, was untouched, increasing the improbability of boys having found the Redpoll's nest, as their wont is to pull out every nest they can find, and to wantonly destroy or carry off every egg they can lay their ruthless hands upon. The theory of a passing Jay or Jackdaw or Magpie having carried off the eggs is hard to reconcile with the fact that the lining of the nest was gone. Mayhap the old birds may have removed it to line a new nest subsequently to the eggs being taken from the old one. It is believed this is the first recorded instance of the Lesser Redpoll's nest having been found in Sussex. Kent, Surrey, Hants are counties mentioned, but Sussex is not, as far as the books consulted may be taken as covering the ground. To revert to the wanton destruction of nests and eggs and young of birds by the ordinary boy nester, I may mention that recently Mr. Arthur Byatt, noticing a hole in a tree mudded up, remarked, "No Nuthatch has done that; some boy has closed it to prevent the birds sitting." He climbed up, removed the mud, was unable to enlarge the hole itself, but, finding the wood thin below it, made a counter opening some nine inches beneath, and dragged out from beneath a lot of rubbish, evidently pushed in through the original opening, six dead young ones of the Green Woodpecker.—C. EASTWICK-FIELD (Hurst House, Midhurst, Sussex).

Common Roller in Sussex.—A Roller (*Coracias garrulus*) was shot on June 2nd at Ninfield, near Sidley, Bexhill, Sussex. The bird was taken to Mr. G. Bristow, of Silchester Road, St. Leonards-on-Sea, for preservation.—THOMAS PARKIN (Fairseat, High Wickham, Hastings).

[Two other specimens of this bird, obtained in Sussex, have recently been recorded in these pages. One procured on Sept. 24th, 1897 (Zool. 1897, p. 469), and the other on Oct. 12th, 1898 (Zool. 1898, p. 24.—ED.)]

Cuckoos' Eggs.—Among the Cuckoos' eggs which I have seen this year are three which are undoubtedly the eggs of the same hen Cuckoo, but not with those of the same species of foster-parent. All three were taken in an adjoining parish—the first on June 8th, with two eggs of the Hedge-Sparrow; the second on June 21st, also with two eggs of the Hedge-Sparrow; and the third on June 24th, with three eggs of the Yellow Bunting; all three being similar in size, shape, and colour, and having a very clearly defined zone at the larger end. A Cuckoo's egg (the reddest I have ever taken), which I found on July 3rd with three eggs of the Reed-Warbler, showed decided traces of incubation when being blown; but the three eggs with it were all quite fresh. The contrary state of things would have been easy to understand, but this I am unable to explain.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

Lesser White-fronted Goose (*Anser erythropus*) in Norfolk.—On Jan. 24th, 1900, an adult female of this exceedingly rare and perfectly distinct species of Wild Goose was procured in Norfolk, and is now in my collection. During my experience I have seen not merely hundreds, but probably thousands of the ordinary White-fronted Goose (*Anser albifrons*) in the flesh, and my eyes are thoroughly accustomed to the general outline and appearance of the bird. When this *A. erythropus* came into my possession in the flesh, I instantly detected its strikingly distinctive characters, and could not help wondering how any person who had ever seen the two birds in a freshly killed condition could doubt for a moment their specific distinctness. This is, I believe, the second instance only on record for Great Britain.—F. COBURN (7, Holloway Head, Birmingham).

Great Black-backed Gull inland in Wales.—Can any reader of 'The Zoologist' say whether the Great Black-backed Gull still breeds on the islet in Llyn Llydaw, under Snowdon, or not? The Rev. W. Bingley, who ascended Snowdon in either 1798 or 1801, stated that a small island in Llyn Llydaw was "in spring the haunt of the Black-backed Gulls (*Larus marinus* of Linnæus), which here lay their eggs and bring up their young" (North Wales, 1804). And Dr. Mavor's companions, when on Snowdon in 1805, near the edge of the precipice over the lakes, were enveloped in cloud, and heard the hoarse note of the Cob (*vide* Zool. 1886, p. 488, for this name), "a bird frequenting the alpine heights" ('The British Tourists' or Travellers' Companion,' 1809, vol. v. p. 276). Until the last few years these birds were reported to breed on an islet in an inland lake in Merionethshire; and this year (1901) I saw, on two occasions in May, a pair of fine old

birds on the shore only a few miles from the said lake. Also, when was at Llyn Dinas, near Beddgelert, on May 13th, I saw three Great Black-backed Gulls pass over the lake, and go on up the valley, getting very high up in the air. One at least appeared to be adult, and I could see no dark marks on the tails of any of them. If they continued their flight for three miles up the valley, and then for about one and a half up a tributary stream, they would arrive at Llyn Llydaw. But they were perhaps rising in the air to go by a more direct route, crossing the wall of mountain. Llyn Llydaw is about twelve hundred feet higher than Llyn Dinas.—O. V. APLIN (Bloxham, Oxon).

Some Strange Nesting Habits in Holland.—The Oystercatcher, recorded as nesting on turf, is not the only bird in Holland to depart from its usual custom as known with us. The Common Tern, instead of nesting along the seashore, there nests as a Marsh Tern in fresh water, in company with Black Terns, as well as on short turf, in company or close proximity to the Oystercatcher. I have photographs of nests in both positions. The Common Heron, in one "meer" at all events, nests amid the reeds exactly like the Purple Heron, though elsewhere in Holland it nests in trees as in England.—R. B. LODGE (Enfield).

Birds in Nest-Boxes.—The following birds have nested in our boxes during the past season:—Nuthatch, Great Tit (seven or eight nests), Blue Tit, Tree-Sparrow (for the first time), House-Sparrow, Starling, and Wryneck. Going the round of the boxes one day, I found a Dormouse in one, which is nailed to an elm-tree about twelve feet from the ground, and I not unfrequently find Great Bats in them. These are undesirable tenants, as when they get into a box no bird will come there. In one box, the lid of which had been blown off in the winter, I found a Squirrel's nest. We find that our boxes here are most successful when put up at a height of about twelve or fourteen feet.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

PALÆONTOLOGY.

Fossil Vertebrates from Egypt.—I have recently returned from Egypt, where, in conjunction with the members of the Egyptian Geological Survey, I have been collecting vertebrate fossils from the Tertiary Beds of the Western Desert. The most important collection was made during an expedition with Mr. H. J. L. Beadnell, and includes remains of primitive Proboscideans from Upper Eocene and

Oligocene Beds. From the latter horizon the mandible of an animal closely allied to Mastodon was obtained.* In this two premolars and three molars are in place simultaneously, and none of the teeth have more than three transverse ridges. From the Upper Eocene came portions of the skeleton of a heavily built animal, the teeth of which somewhat resemble those of Dinotherium, but there are three premolars and three molars in both upper and lower jaws, and all the molar teeth are bilophodont except the last lower molar, which has a well-developed talon. The mandible is provided with a pair of procumbent tusks. The especial interest of these new forms is that hitherto no Proboscidea earlier than the Miocene were known. At the beginning of that period Mastodon and Dinotherium appeared in Europe, the region from which they were derived being uncertain. It now appears that they must have originated in the Ethiopian region, the tertiary vertebrate fauna of which has up till now been almost unknown. Numerous remains of Sirenians, Zeuglodonts, and various reptiles and fishes were also collected. — C. W. ANDREWS (Geological Department, British Museum).

* This I am describing elsewhere in greater detail under the name *Palæomastodon beadnelli*. The Dinotherium-like animal mentioned below has been designated *Bradytherium grave*.

NOTICES OF NEW BOOKS.

Cambridge Natural History. Vol. VIII. *Amphibia and Reptiles.* By HANS GADOW, M.A., Ph.D., &c. Macmillan & Co., Limited.

THIS is a very welcome addition to the naturalist's library. In a general way the subject has been treated in the different serial zoological publications which have appeared during late years, but then the limit of space has been defined by the publisher rather than the limits of the subject by its author, while now a volume of some 650 pages has been devoted to it.

Dr. Gadow has done his work very thoroughly, and one very prominent and useful feature is to be found in the outline maps, which give at a glance the distribution of the larger groups and families. It is abundantly evident that this method is far clearer and much more convincing to the reader than a verbal enumeration of zoo-geographical provinces and regions, which are now no longer uniform in use and description. Thus when we come to the Frogs (*Ranidae*) a glance at the map at once shows the startling fact to the uninitiated that practically none are found in Australia, and that they are also absent from the larger and southern portion of South America. We are also glad to see the correction of some popular and unexpected errors. We have all read and re-read Wallace's charming 'Malay Archipelago,' which has even a greater charm to those who have visited the region, and we well remember the account and figure of the Bornean "Flying Frog" (*Rhacophorus pardalis*). Specimens from Wallace's collection are in the British Museum, and it appears that the dimensions have been incorrectly given. It now appears that instead of the webs of all the feet together measuring about twelve square inches, they only measure three square inches. "By some unfortunate oversight Wallace must have mixed up the total expanded area with that of the four hands and feet."

In this publication the subjects are not restricted to "living animals," and the Dinosauria receive fuller treatment than that of the usual inscription on a zoological tombstone. We are no longer living in a Reptilian age, the sun of which has probably set for ever so far as this planet is concerned; and the practice has been too much to neglect the dead giants of the past in describing the living pigmies of the present. Dr. Gadow has not followed this unfortunate method of obscurity. We notice in respect to the "Snake-eating Cobra" (*Ophiophagus elaps*), it is stated that it reaches the enormous length, for a poisonous snake, of twelve feet or more. In 'The Zoologist' for 1875 (p. 4625) will be found the record of one brought from the Malay Peninsula, which was measured by Dr. Günther, and attained a length of 13 ft. 2 in.

This is really a book for reference, and maintains the high character of the series. The illustrations are excellent, and the drawings on wood have been, with few exceptions, made by Miss Durham, mostly from living specimens.

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BIOLOGICAL SUGGESTIONS.

ANIMAL SENSE PERCEPTIONS.

BY W. L. DISTANT.

Whether Bees are susceptible of feeling and capable of thought is a question which cannot be dogmatically answered.—HUXLEY.

It is indeed still not infrequently the custom to deny absolutely to the lower animals reason and religion.—HAECKEL.

It is, I think, generally assumed not only that the world really exists as we see it, but that it appears to other animals pretty much as it does to us. A little consideration, however, is sufficient to show that this is very far from being certain, or even probable.—Lord AVEBURY (Sir JOHN LUBBOCK).

UNDERLYING all our conceptions of Animal Mimicry and Protective Resemblance is the predicate that other animals see the various objects of nature in similar size, shape, and colour as we do ourselves; in other words, that, though the sensory organs of sight may vary, the practical result is still identical. The same remark applies in a general way to a belief in a more or less universal and similar sensation of touch, smell, taste, and hearing, though on examination it is surprising to find how little positive information exists to warrant the conclusion, even though it may be an absolute fact. If Berkeley asked the old materialistic philosophers whether they could prove the existence of a material world external to the mind, may we not also ask for some more definite proof of the unity and similarity in the sense perception

of animals? If Teufelsdröckh reduced society to a theory of clothes, it would seem that many advocates of Mimicry represent nature by a theory of masks. We observe a strong similarity between an animal and its environment, or between one which we believe possesses a quality procuring immunity from attack, and another in which that quality is absent, and we conclude that the resemblance or mimicry is equally observable by other creatures. Surely an element of error is present in this deduction. Is our world as we see it—and thus can only imagine it—the same in actual identity as that known by the sense cognitions of all animal life? If, as has been ably remarked, the universe contained only blind and deaf beings, it is impossible for us to imagine but that darkness and silence should reign everywhere.* If, on the other hand, we allow—as surely we ought—variation to exist in sense perceptions, as it undoubtedly does in the structure of sense organs, then, without leaving this planet, we may well understand that there are “other worlds than ours.” Even in homology and variation, as Bateson has observed, “we have allowed ourselves to judge too much by human criterions of difficulty, and we have let ourselves fancy that nature has produced the forms of life from each other in the ways which we would have used, if we had been asked to do it.”† Our knowledge of the sense organs in the lower animals is still very imperfect, and sometimes erroneous. Thus Weismann, in his lecture on the “Retrogressive Development in Nature,” delivered in 1866, refers to the “Cæcilians, tropical worm-like or snake-like Amphibians, living underground,” as having “lost not only the sense of sight, but that of hearing also.” When this lecture was translated and published in this country a few years later, the author added a footnote, that “Recent researches have shown us that these animals not only possess a complete auditory apparatus, but that it is even more perfect than in other Amphibia”; and he adds, as a justification for the statement on which he founded his former conclusions, that “Up to the present time our knowledge of the auditory organ of *Cæcilia* has been founded upon the statements of two excellent observers, Professors Retzius and Wiedersheim; but the material at their

* Huxley, ‘Collected Essays,’ vol. vi. p. 253.

† ‘Materials for the Study of Variation,’ p. 33.

disposal was restricted to a few badly preserved specimens.”* The importance of a clear comprehension of animal sense cognitions when a theory like that of mimicry is propounded must be obvious. Take, for instance, a bird and a protectively coloured caterpillar, such as it appears to our cognitions. Should the power of vision in the bird be in excess of that possessed by ourselves, the resemblance may be only superficial and powerless; should it be less, then the protection may be excessive—an idea almost unthinkable in the light of the doctrine of natural selection. We may see what appears to be, and may be, wonderful assimilative colouration or mimicking disguise, but the creature so protected, as it appears to us, may be readily detected by a keenness of scent in its enemies, of which we know little, or by a power of hearing, of which we know less. We certainly do not hear a tithe of the sounds produced by insects; the effect of some stridulating organs we can only comparatively estimate by their structural affinities to others of a more developed character, and which produce sounds capable of being recognized by our own sense of hearing. It is probable that many insect enemies discover their prey by sound alone.† Other creatures find their food without apparently either sight or hearing. According to Jonathan Couch, the common Sea-hog or Sea-egg (*Echinus esculentus*), “though apparently destitute of every sense, or possibility of regarding external objects by sight or hearing,‡ will travel up

* ‘Essays upon Heredity, &c.’ Eng. transl. vol. ii. p. 9.

† “It is of course possible, if not probable, that Ants, even if deaf to sounds which we hear, may hear others to which we are deaf” (Lord Avebury (Sir John Lubbock), ‘Ants, Bees, and Wasps,’ p. 223).—“There are sounds which we cannot hear, there are sights which the eye cannot see. But besides all these there must be countless aspects of external nature of which we have no knowledge; of which, owing to the absence of appropriate organs, we can form no conception; which imagination cannot picture, nor language express” (Balfour, ‘Foundations of Belief,’ p. 69).—On the other hand, Mr. Pocock asserts that “there is not a particle of evidence that either the large Spiders or the Scorpions can hear the sounds that their own stridulating organs emit” (‘Natural Science,’ vol. ix. p. 24).—Mr. Edmund Selous inclines to the view that “thought transference” occurs among birds (‘Bird Watching,’ p. 219 *et seq.*).

‡ By experiment, Romanes found “the Echini manifesting a strong disposition to crawl towards, and remain in, the light” (‘Jelly-Fish, Star-Fish, and Sea-Urchins,’ p. 319).

the rods of a crab-pot, enter the opening, descend within, mount again to the situation of the bait, and select the particular one that pleases it best."* The homing habits of the Common Limpet (*Patella vulgata*) have been ascribed to the possession of a "locality sense."†

Nearly all writers and investigators have felt the difficulty in properly describing the sensory impressions of animal life. According to Prince Kropotkin:—"We must be prepared to find that the usual division of senses into touch, taste, smell, vision, and hearing will not do for the whole series. The senses must be rather divided into a mechanical, chemical, temperature, and light sense, to which the electrical sense will perhaps have to be added. Such a division undoubtedly better answers to the senses which exist in the lower animals, and when the series is considered in an ascending order, the gradual differentiation of the chemical sense into taste and smell, and of the mechanical sense into touch, hearing, and pressure sense, becomes evident."‡ Brehm states that careful observations on the habits of Mosquitos "places it beyond doubt that in the discovery of their victim they are guided less by sight than by smell, or perhaps, more correctly, by a sense which unites smell and tactile sensitiveness;§ while Mr. J. A. Thomson, in an editorial note, remarks: "The somewhat mysterious reference which Brehm makes to a sense between smell and touch is thoroughly justifiable. To the senses of many of the lower animals—and even of fishes—it is exceedingly difficult to apply our fairly definite human conceptions of smell, taste, touch, &c."|| The restlessness or alarm shown by birds or other animals before the occurrence of an earthquake sensible to man is well known, and is probably due to the very small tremors which precede the larger vibrations.¶ Dr. Alexander Hill has recently sympathetically approached this subject, and we give one extract in his own words:—"If we try to figure to ourselves the mental activities of any animal, we

* 'Illustrations of Instinct,' p. 12.

† Cf. Lloyd Morgan and J. R. A. Davis, 'Nature,' Dec. 6th, 1894, and March 28th, 1895.

‡ 'Nineteenth Century,' vol. xl. p. 252.

§ 'From North Pole to Equator,' p. 84.

|| *Ibid.* p. 568.

¶ Cf. 'Nature,' vol. liv. p. 424.

recognize at once that its thought must take the colour of the sense by which they are chiefly prompted. A Dog, for example, does not recognize 'a family likeness,' but a family smell. In a day of happy wandering down the village street, and through the lanes, it pays no attention to the picturesque. As it lies in front of the fire, reviewing the experiences of the day, it recalls a long succession of suggestive smells. It is the cheek-bristles of the Otter which vibrate with excitement as it remembers the slippery-sided Salmon it nearly mistook for an alder-root. The Cat twitches its ears as it dreams of bursting unannounced into a seminary of Mice. If we wish in any degree to realize what our thoughts would be like if we were to exchange our brain for the brain of some other animal, we must ask, first, Which of the five sense organs is the one through which this particular animal chiefly looks out upon the world?"* Again:—"We see with the clearness of the lower vertebrates—birds, reptiles, and fishes, in which vision is mono-scopic—although we, in common with Monkeys, and some other of the higher vertebrates, have acquired the power of stereoscopic vision."† Jordan and Kellogg, in a recent volume in which the theory of mimicry is treated as an absolute fact, still remark:—"It will be recognized that in the study of how other animals feel and taste and smell and hear and see, we shall have to base all our study on our own experience. We know of hearing and seeing only by what we know of our own hearing and seeing; but by examination of the structure of the hearing and seeing organs of certain other animals, and by observation and experiments, zoologists are convinced that some animals hear sounds that we cannot hear, and some see colours that we cannot see."‡ If we consider the lives of purely nocturnal animals, the fact is impressed on our minds with irresistible force, that the world they see and know must have a totally different aspect to what we realize by the light of day, whilst their living environment is also under different conditions. Except on moonlight nights darkness must reign supreme, whilst a general silence replaces the hum of animal life, and nature ever seems to sleep. Such must be the experi-

* 'Introduction to Science' (Temple Encyclop. Primers), p. 32.

† *Ibid.* p. 38.

‡ 'Animal Life,' pp. 224-5.

ence of an animal like the Tasmanian Devil (*Sarcophilus ursinus*). The Common Earthworm must possess little cognition of a material world external to its very limited sense perceptions. As remarked by Darwin:—"Worms are poorly provided with sense organs, for they cannot be said to see, although they can just distinguish between light and darkness: they are completely deaf, and only have a feeble power of smell: the sense of touch alone is well developed."* The world as we know it is therefore actually non-existent to these simply organised animals.

The microscope reveals the existence of living beings of which by our unaided eyesight we should have scarcely dreamed; or, if the scientific imagination had been compelled to predicate their being to account for physical and evolutionary results, we should still have been in profound ignorance as to their structure, life, or habits.† So we may readily imagine some animals as possessing a sense of vision unfolding the details of nature around us in a manner far beyond our ken, while others may have the sensations of sight so blunted and obtuse that only the mighty things of the world come under their individual notice. If we allow our reason to run riot with the first reflection, we can conceive a sky and earth very dissimilar to those of our experience. Through an atmosphere clouded with dust and germs such beings should gaze upon a sun by day as only known at present by our telescopes; at night the story told by astronomers would be exhibited to their unaided eyes: all ideas of dimension would be increased; the hidden things of natural life would be exposed; animal and vegetable tissues would appear transformed, and our ideas as to assimilation in colour and structure be in many cases destroyed, and others created of a fuller and more comprehensive type.

* 'The Formation of Vegetable Mould,' &c. p. 315.—In the words of G. H. Lewes, "Light, colour, sound, pain, taste, smell are all states of consciousness, and nothing more. Light with its myriad forms and colours—sound with its thousandfold like—make nature what nature appears to us; but they are only the investitures of the mind. Nature is an eternal Darkness—an eternal Silence."

† "Beyond the reach of the microscope, there are still worlds of events in nature which we can never see, although we may infer the existence of some of them in other ways."—G. J. Storey (Sci. Proc. R. Dubl. Soc. n.s. vol. viii. p. 230).

Under the second supposition the mystery of life would be still more behind the veil than at present, natural causation would be even less understood ; things would be fewer and farther away, the smaller non-existent, the larger more superficially appreciated. Would nature be the same under such different conceptions ?—and yet the sense of sight has been alone considered. With a difference in the sensory organs or sensations of smell, a fetid stink might be appreciated as a sweet odour ; touch may from a similar reason become an unknown and unimagined power, or an imperfectly realized sensation ; from a like cause taste may be so varied as to be outside the nauseous or agreeable experiences ; while the sense of hearing might develop a familiarity with sounds of which we are absolutely ignorant, or otherwise prove oblivious to some of our most common perceptions.* Without losing ourselves in metaphysical subtleties as to whether things really exist as cognizable by our sense organs, or whether much of our materialism is not only to a considerable degree a question of sensation, we must at least push that problem beyond ourselves, and estimate it throughout all animal life if we hope to gain any clear ideas of the phenomena of animal colouration, or the more complex conceptions of mimicry or protective resemblance. For instance, it has been proposed that the striped Tiger finds the protection of “aggressive mimicry” by the blending of its colours, or the assimilation of the same, with the reeds or bamboo clusters in which it hides. This is undoubtedly true so far as our own sense organs or powers of sight are concerned ; but do the Antelopes or other animals on which it preys have the same sensations on the matter as ourselves ? Increase the penetrating power of vision, and the differences will be so clearly seen and magnified that the theory falls to the ground ; decrease the same, and the proposition becomes more capable of proof. And yet this is the crucial question ; one we answer by inferences, but one to which we can give no absolute reply.

Again, what do we know as to the colour perceptions of

* Cases of atrophy following disease appear to be always attended by a corresponding increase of other organs ; blind animals always possess very strongly developed organs of touch, hearing, and smell.” Cf. Weismann, ‘Lectures on Heredity,’ &c., 2nd ed. vol. i. p. 88,

insects?*

From experiments made with Ants, Lord Avebury considers as proved that these insects perceive the ultra-violet rays. As he remarks:—"As every ray of homogeneous light which we can perceive at all appears to us as a distinct colour, it becomes probable that these ultra-violet rays must make themselves apparent to the Ants as a distinct and separate colour (of which we can form no idea), but as unlike the rest as red is from yellow, or green from violet. The question also arises whether white light to these insects would differ from our white light in containing this additional colour. At any rate, as few of the colours in nature are pure, but almost all arise from the combination of rays of different wave-lengths, and as in such cases the visible resultant would be composed not only of the rays which we see, but of these and the ultra-violet, it would appear that the colours of objects and the general aspect of nature must present to them a very different appearance from what it does to us."† The late Prof. Riley was of the same opinion:—"So far as experiments have gone, they show that insects have a keen colour sense, though here again their sensations of colour are different from those produced upon us."‡ It is said that certain night-flying insects invariably visit white flowers, as we reasonably believe, because of the easy detection of that colour in an obscure light, and we may accept the night preference to such flowers as an undoubted fact.§ But we cannot say that the hue which we describe as white is the same as that apprehended by the insects. Distinct it must undoubtedly be to secure the permanent selection of their visits, but we can say no more. Because an insect

* "What we, therefore, distinguish as light and colour arises from a subjective property of the retina, inasmuch as it only reacts on certain other vibrations. We might therefore imagine the existence of eyes which could not perceive the intermediate parts of the spectrum as ours can, but only the rays situated at the invisible ends. To such eyes the world would have quite a different aspect." Cf. Bernstein, 'The Five Senses of Man,' p. 104.

† 'Ants, Bees, and Wasps,' p. 220.

‡ Pres. Addr. Biol. Soc. Washington. Cf. 'Nature,' vol. lii. p. 210.—An article appeared on "Animal Vision" in the 'Spectator,' June 8th, 1895, which was really a contribution to the study. The writer remarked:—"There is little positive evidence that the larger quadrupeds, Oxen, Deer, the *Felidæ*, or Dogs, have much sense of colour."

§ Prof. Plateau affirms that "the admiration of insects for flowers does not exist." (Mém. Soc. Zool. de France, vol. xiii. 1900. Cf. summary of same papers, Ent. Month. Mag. 1901, p. 211.)

invariably selects and visits a flower of one particular colour, we can only record the observation, but certainly not assume that what we see as white is seen by them in the same hue. Mr. J. A. Harvie-Brown has protested against the assumption "that the colour of insects, as seen by us, is comparable with what may be seen by fish. Fish see though a different medium from ours, and surely we see differently through theirs."* Prof. Plateau, an authority on the physiology of Arthropods, a few years ago published a series of memoirs giving the results of his experiments in endeavouring to ascertain the actual powers of vision possessed by insects and other Arthropods.† Dr. Sharp, of Cambridge, has placed us all under an obligation by giving a condensed account of these observations, and also a critical summary of results. He gives his general impressions as derived from Plateau's experiments as follows:—

"1. Insects in motion are guided largely by the direction of light, and the existence of lights and shades. That when walking they are guided by a combination of light-impressions, with specific habit (that is, going upwards or downwards, towards the light, or away from the light), and by tactile impressions; these latter not acting when the insect is in flight.

"2. That there is at present no evidence at all that the light perceptions are sufficiently complex to be entitled to be called seeing; but that, as the large development of the compound eye permits the simultaneous perception of movement, its direction, and of lights and shades over a certain area, a Dragonfly may pursue and capture another insect without seeing it in our sense of the word seeing."‡

Before leaving this section of our subject, and to make clear our suggestion that little can be justly predicated as to sight preferences or warnings by insects, we may again quote Mr. G.

* 'The Wonderful Trout,' p. 42.

† 'Bull. de l'Acad. Roy. de Belgique,' 1887, 1888.

‡ 'Trans. Ent. Soc.' 1889, pp. 407–8.

Dr. Sharp has elsewhere described the compound or faceted eyes of insects as being "totally different in structure and very distinct in function from the eyes of Vertebrata, and are seated on very large special lobes of the brain, which indeed are so large and so complex in structure that insects may be described as possessing special ocular brains brought into relation with the lights, shades, and movements of the external world by a remarkably complex optical apparatus" ('Cambr. Nat. Hist.' vol. v. p. 98).

J. Storey, who describes the limits of insect vision, in the terms of a coarse mosaic or rough imperfect representation of the external world, the result of the perceptions acquired by their compound eyes; while he asserts that "the insect cannot see more details upon its own antennæ, close as they are to it, than we can with our own naked eye. We must therefore dismiss from our thoughts the mistaken impression that insects see very minute objects far beyond human vision."* Nor can we, as remarked before, conclude that they appreciate colours similarly to ourselves. The question was well put by Lord Rayleigh some years ago, who added the remark:—"Surely this is a good deal to take for granted when it is known that even among ourselves colour-vision varies greatly, and that no inconsiderable number of persons exist to whom, for example, the red of the scarlet geranium is no bright colour at all, but almost a match with the leaves."† The only rejoinder to this proposition at the time was the suggested argument based on the spectrum of the light of the Firefly, which had been found to be perfectly continuous, without traces of lines either bright or dark, and to extend from about the line C in the scarlet to F in the blue. It is composed of rays which act powerfully on the eye, but produce little thermal or actinic effect. In other words, the fly, in producing its light, wastes but little of its power. The writer, however, was careful to add:—"This, it is true, tells us nothing as to the colour sensations of the insect, but it appears to show that the same rays are luminous to its eyes which are luminous to ours."‡ This is precisely the view here again suggested—the same ray or object is seen as by ourselves; but the colour, size, or structure of both respectively may be altogether different, or at least considerably diverse from those apprehended by our own cognitions. This does not, however, necessarily invalidate the conclusions we have formed as to the actual existence of some forms of protection by what we understand as mimicry or protective resemblance. It may be taken to prove that both the object resembled

* 'Sci. Proc. R. Dubl. Soc.' n. s. vol. viii. p. 238.—Cf. Joh. Müller ('Zur Vergleichenden Physiologie des Gesichtssinnes,' p. 322), and Burmeister ('Manual Entomology,' Eng. transl. p. 489).

† 'Nature,' vol. xi. p. 6.

‡ J. J. Murphy, *ibid.* p. 28.

and the mimicking creature may possess the unison we see, but under different characters and under different conditions. Thus to a colour-blind person who visualizes blue as green, what we should understand as a wonderful resemblance in a blue animal to its blue environment would be to him the assimilation in colour of two green objects. To a near-sighted person,* the mimicking resemblance of a *Phasma* to the leaf or twig on which it was found would probably be much greater than that appreciated by the possessor of stronger and more penetrating powers of vision; and the same fact as observed by both would, if analytically recorded in each case, be capable of modifying or enlarging our conceptions of the phenomena or theory under consideration. But how much more cogent is this suggestion if we compare the resultant of human power of vision with that possessed by other animals—say, as low in the scale of derivation as insects—whose eyes have a structure so dissimilar to our own, and whose sensory impressions are therefore likely to be so totally diverse.† The very essence of the theory of evolution predicates a vast difference in the sensation of vision, which must vary as the organ does in structure. As Darwin observes:—"Within the highest division of the animal kingdom, namely, the Vertebrata, we can start from an eye so simple, that it consists, as in the Lancelet, of a little sack of transparent skin, furnished with a nerve, and lined with pigment, but destitute of any other apparatus. In fishes and reptiles, as Owen has remarked, 'the range of gradations of dioptric structures is very great.'"‡ Wal-

* Imperfect vision is a frequent cause of illusion. Prof. Sidgwick's Committee of the "Society for Psychical Research" were acquainted with a short-sighted friend who had several times mistaken a "projecting corner of a rough stone wall for a lady with flounced skirts" ('Edinburgh Review,' January, 1895, p. 98).

† Mr. Hickson has pointed out that in some fishes of the deep sea (*Scopelidæ*), "not being provided with well-developed eyes or phosphorescent organs to attract their prey, the pectoral fins and the outer rays of the pelvic fins have become elongated, and provided with special sense organs for searching for their food in the fine mud of the floor of the ocean" ('The Fauna of the Deep Sea,' p. 159).—There is a general similarity in the colouring of animals inhabiting these depths with the mud of the ocean floor, but "protective resemblance" can scarcely be claimed when the tactile sense compensates for the loss of sight.

‡ 'Origin of Species,' 6th ed. p. 145.

lace states his conviction that "long- and short-sightedness, and the various diseases and imperfections to which the eye is liable, may be looked upon as relics of the imperfect condition from which the eye has been raised by variation and natural selection."*

Do we not therefore go far beyond the scientific use of the imagination, when, as in the practice now so much in vogue, we not only conclude that every well-established colour and marking, if not advantageous, is certainly not disadvantageous in the struggle for existence, but add the further postulate that they are so by reason that animal vision appreciates them in the same manner as understood by ourselves.

Even among ourselves the power of sight is a variable quantity. Hottentots have been described as possessing keen powers of vision. By the quickness of their eyes they can discover buck and other kinds of game from a great distance; "they are equally expert in watching a Bee to its nest. They no sooner hear the humming of the insect than they squat themselves on the ground, and, having caught it with the eye, follow it to an incredible distance."† Lumholtz gives a similar testimony. "The Australian Bee is not so large as our House-fly, and deposits its honey in hollow trees, the hives sometimes being high up. While passing through the woods, the Blacks, whose eyes are very keen, can discover the little Bees in the clear air as the latter are flying thirty yards high to and from the little hole which leads into their store-house. When the natives ramble about in the woods they continually pay attention to the Bees, and when I met Blacks in the forests they were, as a rule, gazing up in the trees. Although my eyesight, according to the statement of an oculist, is twice as keen as that of a normal eye, it was usually impossible for me to discover the Bees, even after the Blacks had indicated to me where they were."‡ Darwin has remarked, as a result of reviewing the evidence on the subject, that savages are generally long-sighted, and quotes Rengger's experience in Paraguay as to repeated observations that Europeans who had been brought up and spent their whole lives with the

* 'Darwinism,' p. 130.

† Barrow, 'Trav. Interior of Southern Africa,' vol. i. p. 110.

‡ 'Among Cannibals,' pp. 142-3.

wild Indians did not equal them in the sharpness of their senses.* On the other hand, as the result of the 'Report of the Anthropometric Committee, British Association, 1881,' Mr. Roberts stated that the figures gave no support to the belief that savages possess better sight than civilized peoples, and spoke of "the common mistake of travellers in confounding acuteness of vision with the results of special training or education of the faculty of seeing, results which," as he remarked, "are quite as much dependent on mental training as in the use of the eyes." As pointed out by Haeckel, our own eyes are subject to the law of divergent adaptation. "If, for example, a naturalist accustoms himself always to use one eye for the microscope . . . then that eye will acquire a power different from that of the other. . . . The one eye will become short-sighted, and better suited for seeing things near at hand; the other eye becomes, on the contrary, more long-sighted, more acute for looking at an object in the distance. If, on the other hand, the naturalist alternately uses both eyes for the microscope, he will not acquire the short-sightedness of the one eye, and the compensating degree of long sight in the other, which is attained by a wise distribution of these different functions of sight between the two eyes."† And so, even at the risk of being accused of rank Lamarckism,‡ may

* Cf. 'Descent of Man,' 2nd ed. pp. 33-4.

† 'History of Creation,' 4th ed. vol. i. p. 269.

‡ By many evolutionists who advocate Darwinism as sanctioned by Weismannism, it has recently become the vogue to not only decry Lamarck, but to denounce what they consider as the Lamarckian heresy. Not only have his views been condemned and ridiculed, but even his honesty has been called in question. Thus a recent writer, after remarking on the extraordinary coincidence of the independent conception of "Natural Selection" by Darwin and Wallace, cannot adopt the same view as to some coincidences in the writings of Lamarck and Erasmus Darwin; and although the first named, in his '*Animaux sans Vertébrés*,' states that his theory is the first that has been presented, this does not satisfy the suspicions of his critic, who writes:—"But if Lamarck borrowed without acknowledgment, it would be but a small step further to write the passage in question" ('Nature,' vol. lli. p. 362). Prof. Osborn, in his 'From the Greeks to Darwin,' has examined, discussed, and reduced this imputation to the character of "unproved slander." How different is the verdict of one well able to judge. Huxley writes of "the famous naturalist Lamarck, who possessed a greater acquaintance with the lower forms of life than any man of his day, Cuvier not excepted, and was a good botanist to boot" ('Collected

we not assume a similar process to have occurred with the eyes of insectivorous birds to whom a microscopic search for insects becomes a necessity of life; whilst the soaring Vulture has developed a long-sightedness which enables it, if not to see the quarry, at all events to discern its distant companion descending to the same. We have said we may be accused of Lamarckism, because it does not seem to be allowed by many of the followers of Weismann that an acquired character may be capable of being perpetuated and accentuated by the action of "Natural Selection."*

As with insects, we know little of the sight perceptions of other and much more highly developed animals. When in South Africa, I kept a young Baboon, who seemed pleased, at the decline of day, to mount a low roof, and watch the setting sun. I gazed at the same, but did we both see a similar appearance?† Turner could see and paint a sunset unappreciable by the senses of ordinary men who possess similar organs of sense. What did my Baboon see as he gazed in the same direction as myself? The question seems unanswerable. Could it have faithfully drawn and painted what it saw, such a picture could only appear to my senses as an exact representation of what I now see, and

Essays,' vol. ii. p. 11). And again he remarks:—"The Lamarckian hypothesis has long since been justly condemned, and it is the established practice for every tyro to raise his heel against the carcase of the dead lion" (*ibid.* p. 12). When the devoted disciples of Weismann, aghast at the least argument for some amount of direct environmental change or inheritance of acquired character, raise the cry of "Lamarckism," we are reminded of the XXXII controversial stratagem described by Schopenhauer:—"If you are confronted with an assertion, there is a short way of getting rid of it, or, at any rate, of throwing suspicion on it, by putting it into some odious category; even though the connection is only apparent, or else of a loose character. You can say, for instance, 'That is Manichæism,' or 'It is Arianism,' or 'Pelagianism,' or 'Idealism,' or 'Spinozism,' or 'Pantheism,' or 'Brownianism,' or 'Naturalism,' or 'Atheism,' or 'Rationalism,' 'Spiritualism,' 'Mysticism,' and so on" ('The Art of Controversy,' Bailey Saunder's transl. pp. 41-2).

* H. M. Bernard has apparently used a similar argument for "the transmission of acquired characters by inheritance, this inheritance coming in as a natural term at the end of a long series of individual acquirements" ('Nature,' vol. l. p. 546).

† According to Topinard, "the organ of vision is similar in man, the anthropoid apes, the pitheciens, and the cebians" ('Anthropology,' p. 95).

therefore believe to exist. The Baboon could only represent the phenomenon under the colours as they appeared to him, but if such colours have a different appearance to me, both picture and subject would still be identical, and prove absolutely nothing. To take an extreme illustration. Suppose what is white to me is black to my Baboon, and *vice versa*. If my animal faithfully paints a white flower as black, as it sees it, the picture must still show a white flower to me, because of our different sense appreciations.*

Leeches (*Clepsine*) afford a good instance of the variety in sense perception. Prof. Whitman has paid much attention to these animals, and writes :—"Pass the hand over a dish in which a number of *Clepsines* are resting quietly on the bottom, and at a distance of a few inches above the animals, taking care not to make the least jar or other disturbance. If the animals are quite hungry, the slight shadow of the hand, imperceptible though it be to our eyes, will be instantly recognized by them, and a lively scene will follow, every Leech rising up, supported on its posterior sucker, and swinging at full length back and forth, from side to side, round and round, as if intensely eager to reach something. Put a Turtle in the dish, and see what a scramble there will be for a bloody feast. The shadow of the hand was to these creatures like the shadow of a Turtle swimming or floating over them in their natural haunts, and hence their quick and characteristic response. A piece of board floating over them would have the same effect. Although so sensitive to a small difference in light, the *Clepsine* eyes can give

* This may also be illustrated by the perceptions of persons suffering from red-blindness. As Bernstein observes :—"The world must appear to them quite differently coloured to what it appears to us. What looks to us white, must to them have a greenish-blue appearance, because red is wanting in it ; and yet they call it white, because it comprehends the whole of their series of colours" ('The Five Senses of Man,' p. 115). Even our own sense perceptions may be only temporary. We call a body white when it reflects all the colours of the spectrum in the proportions in which they are contained in sunlight. As Bernstein further remarks :—"It is very probable that the kind of light which we call 'white' would not remain the same if the proportion of the colours in the light of the sun were to alter ; and since we suppose even the sun and its light may not remain the same for ever, it is quite possible that our descendants may have a perfectly different idea of white to what we now have" (*ibid.* p. 162).

no pictures, and hence there is no power of visual discrimination between objects. They probably recognize their right host by the aid of organs of taste, and at any rate they are often able to distinguish their host from closely allied species.”*

It is a long jump from a Leech to a Rhinoceros, but the principle is the same, though the animals in a developmental sense are so widely divided. Dr. Livingstone describes the Rhinoceros as having such dimness of vision as to make it charge past a man who has wounded it, if he stands perfectly still, in the belief that its enemy is a tree. Dr. Livingstone, however, adds that this imperfect sight probably arises from the horn being in the line of vision, “for the variety named *Kuabaoba*, which has a straight horn directed downwards away from that line, possesses acute eyesight, and is much more wary.”† Mr. Scott Elliot feels sure that the East African Rhinoceros cannot see clearly for more than about fifty yards.‡ Mr. Blanford, writing on the Abyssinian Rhinoceros, states that “they are easily eluded by turning, as they are not quick of sight, and, like most mammals, they never look for enemies in trees; consequently a man two or three feet from the ground will remain unnoticed by them if he keeps quiet.”§ Elephants are reported to have a most defective power of sight, and, generally speaking, among mammals, as a rule, the world, as known by their senses, is probably, if we judge by vision alone, a much more circumscribed one than that cognized by ourselves. With other senses much more developed, and with the addition of some of which we are totally ignorant, nature may be to them revealed beyond our imagination.

According to Dr. Günther, fishes, in the range of their vision and acuteness of sight, are very inferior to the higher classes of vertebrates; yet, at the same time, it is evident that they perceive their prey or approaching danger for a considerable distance; and it would appear that the visual powers of a *Periophthalmus*, when hunting insects on mud-flats of the tropical coasts,

* “Animal Behaviour,” Biol. Lect. Marine Biol. Lab. Wood’s Holl, Mass. 1898, p. 293.

† ‘Miss. Trav. and Research in S. Africa,’ p. 136.

‡ ‘A Naturalist in Mid-Africa,’ p. 247.

§ ‘Obs. Geol. and Zool. Abyssinia,’ p. 248.

are quite equal to those of a Frog.* The Norwegian fishermen whitewash the rocks in the vicinity of their nets, or, where there are no rocks, erect white boards, or suspend sheets, which are termed "Salmon attractors," designed to represent the foam of the cataract, which the Salmon is seeking to ascend. But while the white colour is found attractive, the fishermen believe that the fish avoids red colours, so that red clothing is carefully discarded; and, according to Bishop Pontoppidan, even red tiles have been removed for this reason from a fisherman's house.† Dr. S. Dixon, a president of the Pennsylvania Academy of Natural Sciences, in Philadelphia, had a large aquarium containing goldfish and other aquatic creatures, which he was in the habit of feeding every morning. During the winter, according to the 'New York Tribune,' he wore dark coloured clothing, and as soon as he approached the glass tank all the fish came to the surface of the water looking for crumbs. Changing his clothes to light-coloured fabrics the first day of May, the fish failed to recognize him, and went without food for two days. In fact, we cannot always conclude that the possession of eyes in some fishes is an indication of sight. According to Mr. Beddard, many deep-sea animals are totally blind; yet many species found in the deepest hollows of the ocean appear to have perfectly normal eyes. These discrepancies were partly accounted for by the theory of abyssal light. The histological study of the eyes of certain deep-sea Isopoda, particularly of *Serolis* and *Arcturus*, shows, however, that the appearance of well-developed eyes was often deceptive. Anyone, before having recourse to the microtome, would assert that the deep-sea *Serolis neæva* was as keen-eyed as any species of the genus. Yet sections through the eyes show that it is in a condition of degeneration; apart from the faceted cornea, there is but little of recognizable eye-structure left. In *S. bromleyana* the eyes are well-marked, but entirely devoid of pigment; no trace of optic tissue could be found by microscopical investigation. Mr. Beddard is therefore of opinion that there is no need of any theory of abyssal light; it is more likely that the state of preservation of the eyes is an index of the length of time that the species in question has been an inhabitant

* 'Introd. Study Fishes,' p. 111.

† Cf. Seeley, 'Freshwater Fishes of Europe,' p. 271.

of the deeper waters.* The sight perception of fishes is clearly a phenomenon, of which we have practically the smallest information, and the scantiest imagination.

It is even probable, as Bernstein has proposed, that the perception of the external world is essentially an act of the mind, which has its seat in the cerebrum, and is connected with this organ; and, further, that the sensory organ, with its nervous connections, only affords the brain the material which it converts into a Sensory Perception.† For it has been observed with Pigeons, that upon the removal of the cerebral hemispheres, in which state they may live for some time, they still possess a sensation of light, which penetrates the eye, and causes a contraction of the pupil; an action which can only be caused by the central organ of the optic nerve in the brain. But a comprehension of the objects seen—*i. e.* a true perception of the senses—is no longer possible to these animals. They behave like blind animals, run against every obstacle, and no longer possess the power of recognizing the objects seen as belonging to the external world.‡

If it is granted that the perception of the external world is essentially an act of the mind, and has its seat in the cerebrum of man, and that Pigeons are proved to have the same relation between their sight perceptions and the integrity of their cerebral hemispheres, then we cannot hesitate to apply the qualifying influence of difference in evolution of cerebral matter between man and other animals as largely modifying their power of equally appreciating by sight the shape, colour, and size of the different natural objects around them. We may therefore pause before concluding that the insectivorous mammal, bird, or reptile sees as we do the “protective” or “non-protective” shape and colouration of its prey, or that the bird to the insect, or the insect to the bird, appears to each, as both to ourselves. And so with all that we consider “warning colours,” a great element of error may exist in our calculations, owing to a difference in the sense perceptions of the animals most clearly interested in the theory formulated.

* ‘Natural Science,’ vol. vii. p. 56.

† Cf. ‘The Five Senses of Man,’ p. 163.

‡ *Ibid.* pp. 162-3.

AN OBSERVATIONAL DIARY OF THE HABITS—
MOSTLY DOMESTIC—OF THE GREAT CRESTED
GREBE (*PODICIPES CRISTATUS*), AND OF THE
PEEWIT (*VANELLUS VULGARIS*), WITH SOME
GENERAL REMARKS.

BY EDMUND SELOUS.

I MUST premise that for many mornings before the date at which I commenced to take notes I had watched this pair of Grebes, but seen nothing which struck me as of interest. I could not detect a nest, nor were the birds building; so that, judging by the dates and the working hours of last year, I thought all this was to come. As it turned out, however, last year was no criterion for this, and I regret now that I did not begin watching sooner, and stay, each morning, later. As the nest—which, I afterwards found, had been already completed—seemed much less massive, and generally inferior to the ones I had previously seen made, it would have interested me to have observed whether there was any corresponding difference in the building of it, anything suggesting that it was built with an object other than that of incubation—or rather, with such other object alone. Of this, however, I will speak later. It is, of course, impossible actually to prove that these Grebes were the same ones that I have before given an account of.* But as they were the one and only pair on the same sheet of water, and as the nest was in approximately the same place, I assume and feel personally quite certain that they were. As will have been gathered, though I have not expressly stated it, there was only one pair of Grebes (and, for a few days, an odd bird) on the water last year. I now commence my diary.

April 22nd, 1901.—Something is now visible in the conduct of the two Grebes, which seems to betoken the approach of nuptial activities. They seem to become excited, occasionally, together. One dives, and is instantly followed by the other.

* *Ante*, p. 161.

They dive, too, sometimes, in a more splashy way, particularly once, when the male, I think, went down, kicking the water up behind him in an exuberant spirit. Once one of them—I think again the male—comes up with something in his bill, which he dabbles about on the surface, and seems to sport with, the other coming close up and appearing to take an interest. I do not think this something is a fish; it seems too weighty and voluminous, nor do I catch a gleam. I think it is weeds, and pregnant with associations of nest-making, love-making, dalliance on the nest. Once, too, the male flies suddenly some way off over the water, and sometimes the two come close together, fronting each other, and snapping their bills a little. Once or twice also the female bird—as I think it is—has lain all along on the water. I can see no sign of a nest yet, and do not think one has been begun.

April 23rd.—These Grebes have a note which may be described as a kind of bastard quack, for it has much of the qualities of the latter, though harsher and much thinner. In my experience, however, it is seldom uttered, inasmuch as I had not noticed it before the other day, though distance may have had something to do with this. Whilst floating on the water they will sometimes stick a foot right up in the air, and waggle it. One of the pair—the female—has just done so, and it has a very odd effect. Both birds are now fishing. Each has caught a fish, and swallowed it on the surface. There was nothing further to note up till the time I left, which was about 6.30 a.m.

April 24th.—Arrive about 5.30 a.m., and during the earlier part of the morning see nothing to note down. Going away after some time, I return about 7, and then notice one of the birds lying along in the way I have so often described, on a thin patch of weeds extending a little from the shore. This bird is certainly the male, and—just as before—the female swims up, and makes several times as though to spring up also, going and returning, but each time failing to do so. The male then comes off, but almost immediately leaps up on the weeds again, just as he had done on the nest last year, and, assuming the same attitude, there is the same scene over again. Afterwards, when both the birds had swum away, I walked along the bank to the place. It was, as it had looked, a thin line of weeds, which, though

growing, had more the appearance of driftage. Just where the one bird had lain, however, the weeds were thicker, and it certainly looked as though they had been added to. This suggests, of course, that here may be the beginning of a nest; yet of building it I have, as yet, seen no sign. Possibly the birds find pairing in the water difficult, if not impossible, and therefore choose for this purpose a natural foundation of weeds, to which they add when greater stability is needed.

April 25th.—Arrive at 6.30 a.m., and find the birds swimming about. In a little while they both swim to the same little belt of weeds, but if, as is probable, with the intention of pairing, this is not followed up. Several times they front each other in the water, and, with their snaky necks reared up, *tâter* a little with the beak, or make little tosses of their heads in the air.

It is pretty to see these Grebes drink, which they do with a little scoop of their bills on the water, raising, then, the head quickly, till the beak spears perpendicularly up at the sky.

8 o'clock.—The two have just swum to the weeds again, and one of them—I think, this time, the female—lies along amidst them, but without jumping up on to anything. There is nothing further, however, and they soon swim away. But very soon afterwards they return, and one—I think, the male—jumping up and lying along, the other, in a moment or two, follows, and pairing takes place. The second upspringing bird—the one that has just, apparently, performed the office and function of the male—now comes off the platform of weeds, passing forward along the body of the other one, and leaving him upon it. It certainly seems the smaller of the two, and when the other, shortly after, also takes the water, and both are together, this latter seems again, as before, to be the larger, and the one which I have always known and recognized as the male. I carefully keep the two separate with the glasses. A little while afterwards the birds again approach the weeds, and again the male (quite certainly) leaps up and lies along them. He evidently waits for the other—the female—but she this time does not comply. He comes down, follows her a little, they turn, he again leaps up, waits, looks round and waits, but to no purpose. Coming off again, he now (for the first time that I have yet seen) lays some

weeds on the place—whether nest or otherwise—and the female then dives and lays a piece too. They lay two or three pieces between them, but in a very perfunctory manner, and then swim away. Now when the male, as I believe it to have been, leapt up the first time and pairing ensued, he assumed a peculiar pose, curling his neck over and down, with the bill pointing at the ground (weeds) perhaps six inches above it, and stood thus, fixed and rigid, for some moments (as though making a point) before sinking down and lying all along. There was no mistaking the entirely sexual character of this strange performance, the peculiar fixed rigidity full of import and expression. On the two subsequent occasions of his leaping up he made precisely this same pose; his actions from first to last—from his approach and leap to his lying along—were identical in every respect. That it was the larger of the two birds on these two second occasions (the one that I have seen last year act as the male as well as as the female) there is no doubt whatever, and I have hardly, if at all, less doubt that it was the same one (the male) on the first occasion also, and that the female acted as the male bird usually does.

April 26th.—Shortly after I come (about 7 a.m.) the Grebes approach the point of weeds, and, when just off it, front each other, toying with their bills. There is nothing further, however, and shortly both swim together to the opposite shore, and begin fishing. I see each of them come up with a fish, and swallow it. They then swim back to the platform or nest, and the male, without any doubt (that is to say, the considerably larger one which has performed the usual office of the male on various occasions last year), leaps up, and lies along precisely as described yesterday. The female comes up, and seems about to ascend, but (just as last year, both with her and the male) does not do so, and after a little swims out to a short distance, and remains riding at anchor. The male looks round at her once or twice, then stands up, manipulates the weeds a little with his bill, lies along as before, and waits again. This proving to no purpose, he comes off, and rejoins the female, and both swim quietly in each other's company. This is at about 7.30. At 8.15 the birds return, and there is just the same thing in all essential particulars, the male pulling the weeds about in a desultory manner before coming off into the water.

8.40.—The two again at the weeds; the female leaps up, makes the pose, and lies along just as the male has, on previous occasions, done. The male now swims ardently up, but becomes, as it were, nervous, and remains on the water. After a little the female comes off, and, very shortly afterwards, the other—the male—leaps on to the raft, poses and lies along, just as he has done before, and just as the female has done a moment ago. But, as is so frequently the case, the matter proceeds no further.

May 1st.—Got to the water at about 7.30 a.m., and could see no Grebes there. Walking along the shore to the weeds, I found the nest—for I now think it is one—apparently no further advanced than when I last saw it. It is hardly raised above the water, and quite unnoticeable through the glasses, or when not looked directly down upon from quite near. Walking back, I saw both the birds in a part of the water they do not so often visit, and for some time, now, they fished, and I saw them catch and eat several fish. Then they fronted each other in the water, and, erecting their long necks, *tâtéd* a little with the bills in their usual manner, after which they seemed going to the nest, but the intention did not hold. There was now another long interval, and then just the same again, and afterwards I came away without anything further having taken place.

May 2nd.—At 7 a.m. I find the Grebes as before, swimming lazily about, that is to say, and catching and eating a fish now and again, with an easy grace. Nothing of a nuptial character takes place till after 8, when something interesting, and which I have not before seen, does. The two are on the opposite side of the water to the nest, and, fronting each other, *tâter* first with their beaks. Then the female dives, and comes up with a small piece of weed, which she, I think, lets drop. Immediately afterwards—but whether before or after she comes up I cannot quite say—the male dives too—excitedly, I think—and, coming up with a larger piece of weed, the two again front each other, and all at once both of them leap entirely upright in the water, standing, it would seem, on their feet, either upon the water itself or on the mud or weeds just below its surface. This latter I think it must be, since they are now right on shore, and their movements seem to imply a firm basis of support. Still, they have dived, and

been entirely hidden in almost, if not exactly, the same spot, so that its shallowness seems a little difficult to understand. They look like two Penguins, and each, as they stand face to face, must have the fullest view, not only of the front, or throatal, part (which is silvery) of the long and straightly stretched-up necks, but of the whole broad silver surface of the breast and body. Immediately after they have assumed this upright attitude, the hen-bird catches hold of the dangling end of the weed which the male has brought up, and both, holding it between them, make little waddling steps, now forwards, now backwards, but not going more than a few inches either way. I would say that they *chassé'd*—for it had that effect—but the motion was as described, and not from side to side. Even though it is a dull day, with no sun visible, the effect of this—of the two broad silver shields—is most magnificent. They gleam dazzlingly, yet softly; but what must it be when the whole air and water is dancing in glorious sunlight, as it has been all this week, whilst the most tiresomely timed influenza was keeping me indoors! Whether it is a conscious display or not—and the part which the weed here plays makes me doubt this—the birds could not have adopted an attitude or a position in relation to one another better adapted to show off the beauties of their plumage as a whole. The entire surface of silky silver is exhibited by each to each, whilst the crest and tippet is also much *en évidence*.

Having remained thus—upright and moving backwards and forwards as described—for quite an appreciable space of time, both birds sink down again on the water, the piece of weed which they had all the while been holding falling disregarded between them, and the male sets off, full of intention, to the nest on the opposite shore. The female follows, but she lags, pauses when about half-way there, and is some way behind when her husband reaches the nest, and, leaping up, lies along on it in the usual manner. Having come up, she makes ready to ascend, then pauses, swims out again, returns, and does the same several times, the male all the while lying in the attitude he has at first assumed. Then, however—after all these disappointments—and having first looked round, as on former occasions, he begins to move and arrange the weeds with his bill, and afterwards, taking the water, rejoins the female. They float negligently on the

water for a little, then swim together to the nest, and, keeping them perfectly distinct through the glasses, I can say with conviction that it is the male who again, now, leaps up, makes the pose, and assumes the final attitude so often mentioned. The female now acts as before for a little, but on—I think—the first return after swimming a short distance out, springs up, and pairing takes place, she performing, as far as attitude and relative position are concerned—absolutely as far as the eye is capable of detecting—the function and office of the male. Immediately after the pairing she comes forward along the body of the male—on which (as in every case upon either side) she stands perfectly upright—and takes the water, whilst the latter remains on the nest for a little while afterwards before coming down and following her—for she has now swum away. As just before in the ascent, the glasses again say decidedly that it is the male that has descended last from the nest, and the female that has come off before and swum away. The difference in size between the two is very apparent, and if we say (as anyone seeing this morning's drama alone would say) that the larger bird is the female, then I have seen this very bird act last year, time and time again, as the male, whilst the other (which we must in that case suppose to be the male) acted, in the pairing process, the usual part of the female. It must also be remembered that, although last year the transmutation of sexes—as we may call it—between the two birds was not carried by the female to this extreme point, yet up to this point, and in every other particular I saw each of them assume, alternately, and in more or less immediate succession, the character proper to the other. Personally, therefore, I have no further doubt as to this salient peculiarity (for as such it strikes me) in the sexual relations of these Grebes, and, as I can see nothing here, in the shape of artificial conditions, to suggest its being an individual one (or, rather, an idiosyncrasy shared by two individuals), I suppose it to be specific. If so, that vitiation of the sexual instincts in domesticated birds to which Darwin may perhaps allude ('The Descent of Man,' p. 415) may not really be due to artificial conditions, but natural, in the ordinary sense of the word; for, of course, in a larger sense, everything is, and must be, natural, a fact not sufficiently appreciated by those who, in their investigations—or rather, let us say, their

chaperonings—of nature, seem always to be fearful lest their precocious young *protégée* should “go too far.” “*Supernatural*” is an absurd word, if construed literally, as it seems to be by a great many people. With regard to such birds as domestic Pigeons and poultry, were anything very *outré* in their sexual relations to be observed, it would be natural to attribute it to high feeding or artificial conditions generally. But in how many wild species (living a wild life), and upon how many occasions have such matters—such *intima arcana*—been observed? Moreover, as I have already remarked, the thing goes deeper, and requires something of a more general and abiding nature to explain it. As to this, I am unable, myself, to add to what I have already suggested; but I would just *en passant* (in case it might have any significance) draw attention to the fact that in the Great Crested Grebe we have an example of a specially adorned species, the sexes of which are identical, except in size. This, I believe, is not a common thing amongst birds.

I believe, however, that facts such as I have here recounted may throw light upon much that is puzzling. It is a general view that in the human species the masculine and feminine nature differ considerably, if not essentially; but facts pointing in a contrary direction have sometimes been adduced, as, for instance, that many poets exhibit in portions of their writings qualities that seem feminine rather than masculine. This has been specially remarked of Shelley, but to me it appears much more obvious, and beyond mere matter of opinion in the case of great creators of character such as—to take the most familiar and salient example—Shakespeare. Is it not, really, a very remarkable thing that a man and not a woman should have created Cleopatra, Cordelia, Hermione, Perdita, Constance (those mother-scenes in King John), and so forth? Anyone, I suppose, who has ever read Shakespeare to purpose, must have received the impression that such perfect and consistent organisms, such actual living growths, such vitally informed entities, are beyond the powers of even the keenest observation—that they must have been felt rather than imagined even, and therefore must have belonged to the essential being of the mind from which they emanated. Yet to say that a man can truly and justly feel the feminine nature in its more essential manifestations is to

say no less than that he is in his psychology as much a woman as a man ; which is what, for my part (and *vice versâ*), I am inclined to believe—though, of course, in ordinary persons, the one or the other portion is, generally, more or less in abeyance.

Now it will be admitted—or, at any rate, it seems likely—that the principal differences in the psychology of the sexes have their root in the sexual separation itself, inasmuch as certain main channels of thought and feeling seem by this to be cut off from the one sex or the other, especially from the male one. In the ‘Heart of Midlothian,’ the old hag, who has once nursed Robertson, says to the thief, Levitt, “And man can never ken what woman feels for the bairn she has held, first, to her bosom”; to which he replies, “To be sure, we have no experience.” Were this and many other similar propositions so true as they appear to be, I believe that such man-creators as Homer, Sophocles, Euripides, Shakespeare, &c., would either have left female man alone, as not being content with mere portrait-painting—what we call “study of character”—or else that their productions in it—due to ulterior motives—would have been as notoriously dummies as they are notoriously not. But if either sex has lying latent within it (by inheritance dating from a long-past ancestry) the whole stock of feelings proper to the other, and if what we call creative genius is, or at any rate involves, the power of recalling and shaping these and other—to the many—practically lost possessions, then that quality of *being* another sex which a great poet or writer exhibits in his work is less difficult to understand. There being a foundation (the mental equivalent of those structural retainments which *both* sexes possess) dating from an incalculable antiquity, all the subsequent modifications and developments might conceivably have been added to it, the civilized man or woman receiving respectively the latest and highest touchings (not so extraordinarily high perhaps) of civilized womanhood or manhood, to lie—for the most part undreamt of—in that region of their mentality which has come right down from long-past hermaphrodite forms. Should this appear incredible, I would ask what is the real meaning of the facts which I have here given in regard to these Grebes, and which obviously cannot be explained—(as some other *apparent* abnormalities of this class observable amongst animals may

appear to be)—by there being any check or obstacle in the way of the ordinary sexual instinct? To talk of perversion or vitiation seems to me merely to shirk difficulties, and substitute words for an attempt at a rational explanation. Here are two wild creatures, whose acts must, I think, be assumed to be the outcome of a genuine primary feeling or instinct, unchecked, on the one hand, by any sense of impropriety, and, on the other, unassisted by any pruriency of imagination as we understand it. Each of them acts—and must therefore, also, feel—in turn as the male and female. They are hermaphrodites, in fact, as far as feeling and—to the extent possible—acting is concerned. Vast as must be the interval between them and their hermaphrodite progenitors, I can, myself, see no other explanation of the facts than their having had such progenitors, and if a cause so remote can reach so far down the stream of time, why not farther still?

Returning, now, to the sport or antic which immediately preceded the pairing—or whatever it may be called—of these two Grebes, the special feature of this was, I think, the mutual holding by them, in their bills, of a piece of weed which the male had excitedly dived for and brought up. For the excitement of both birds appeared to me to refer in a special manner to this possession, nor do I think that the upright attitude was assumed in order to display the plumage, though it necessarily had this effect. The weed alone, as it seemed to me, was the occasion of the curious waddly steps backwards and forwards, and it was seized by the female either immediately before or immediately after she stood up. True it was at last dropped, but the instant it was both birds set out for the nest, and we have seen what followed. A suspicion may, perhaps, cross the minds of some that the supposed weed was a fish, and that the birds were fighting for it. But besides that the consummation which I have just alluded to is opposed to this theory, it is in other respects untenable. The birds were close, for the glasses, and I saw the dank, green, dripping substance quite distinctly. Not only, too, have these Grebes never fought (and they might as well fight for the water as for fish), but they have never had, whilst under my observation, one inimical moment. Nor is the particular matter which I have here

recorded of a unique nature. Other birds act, sometimes, in more or less the same way. I have seen a pair of Shags at the nest (but not whilst occupied in building it) hold between them a piece of seaweed, and move their heads about with it in a strange half-coquettish manner, as though they knew what they meant. I have seen Gulls and the Great Skua pick a blade or two of grass, and then run with it to the partner bird, apparently only to show it, for it was dropped and not used in building the nest, which was not just in that place. Each time there was a peculiar kind of consciousness in the manner and look of either bird, impossible not to notice and equally so to describe. I have also seen one of two rival Wheatears, in the midst of violently excited movements, catch up a piece of grass or stick, and run and lay it in a depression of the ground out of which it had just started. In most of these cases, as it has appeared to me, the object thus seized hold of is in the nature of a symbol. That anything used in the construction of the nest should—during the nuptial season—fill the bird's mind with a picture of its construction, and with all the ideas and associations connected with this, we can understand; and, as male birds fight together, at this time, for the possession of the female, it does not seem impossible that a vision of what such possession implies should sometimes pass through the mind of either combatant, when not in the actual frenzy of combat. In the case of the Wheatear, however, there may be another way of explaining this action, to which I will recur. In the other instances its symbolic nature seems more apparent. Especially is this the case with these two Grebes. They seized hold of and moved about with the weed, very much as a man might seize and wave a banner, and a certain set of pleasurable ideas and emotions—to do with nest-building, courtship, dalliance on the nest—became, as it were, focussed by their doing so. Held by both, it was a symbol of what both felt, and of all that related to their mutual affection. I do not, of course, mean to suggest that the birds were conscious of the symbolical meaning of what they did in the way in which a man would be, but if their action was not in its essential nature symbolical, then will anyone explain its precise significance, and why it was so immediately followed by an eager

love-journey to the nest, which was at a considerable distance off? There are, I believe, some—possibly many—peoples amongst whom the ceremony of marriage consists in (or includes) the bride and bridegroom sitting or standing together, either side by side or opposite each other, and holding or grasping something between them. The object, whatever it is, is symbolical of the married state. In every essential except the clear consciousness that they were doing so (to how great an extent this was present or wanting it would, perhaps, be difficult to say), these Grebes, as it appears to me, went through a marriage ceremony.

(To be continued.)

NOTES AND QUERIES.

MAMMALIA.

Note on the Scaly Ant-Eater (*Manis temmincki*).—To trace the origin of curious native sayings or superstitions concerning animals is always a matter of interest, and there are few animals in this country which have given rise to more of these than the Scaly Ant-Eater, or “Aka,” as the natives call it. Among the Mashonas this weird beast, which looks more like a reptile than a mammal in its general appearance, used formerly to be regarded as a special perquisite of the chiefs, and woe betide any venturesome persons who dared to regale themselves on its much-prized flesh, as the punishment for this was death; and, according to most of my informants, the offender was usually killed while asleep, though I failed to find out whether there was any special reason for this. On the other hand, if the lucky finder of one of these animals fulfilled his duty by bringing it to his chief, he was presented with a cow as a reward. The reason for this munificent payment is probably due to the assertion of the Kaffirs that this animal has gold in its entrails. “Not the white man’s gold,” as one of my “boys” informed me, “but Portuguese gold”; meaning thereby that I was not to expect to find sovereigns, but raw gold. On inquiring further from this youth, who belongs to Chikwakwa’s tribe, I was told that the Pangolins were very scarce about his home, and there were only certain Kaffirs who knew how to find them; that they lived principally near the big rivers, and would come out at night to dig in the ground for the gold on which they feed. I had always regarded this eating of gold as more or less of a myth, but recently a wounded Ant-Eater came into my hands, being only the second specimen which I had seen alive, and I was determined to see whether there was any foundation for this curious belief. After the animal had been skinned, I carefully examined the contents of the stomach. This contained numerous heads of a large-eyed termite (*Hodotermes*), which is common in many parts of the country, but mixed with these was a good handful of quartz pebbles and sand. On seeing this, not only the origin, but also the probable truth of the natives’ assertion became obvious at once; for when digging into the nests of ants and termites, and

licking up the insects with its sticky tongue, the Pangolin must necessarily swallow a considerable amount of earth and gravel as well. Now, as I myself have seen, it is often possible in the gold-bearing districts to obtain a good show of "colour" by panning a piece of earth broken at random off a termite-heap, and if in such a locality the Pangolin is liable to swallow a certain amount of quartz pebbles as well, its chances of picking up gold would be much increased. Although the amount of the precious metal swallowed at any one time would be small, yet it would probably tend to accumulate, as the gastric juice would not act upon it. Thus that which, at first sight, appears to be an absurd belief, will probably prove to be an actual fact. Unfortunately the animal which I examined had come from a locality right in the granite formation, and far from any known gold-belt; so that when I panned the quartz from its stomach no gold was to be seen, although there was a good "tail" of pyrites. Some Blantyre natives in my employ said that the Pangolin was common in their country, but that they never ate it, nor did they know anything of its auriferous qualities.—GUY A. K. MARSHALL (Salisbury, Mashonaland).

[I have known this interesting genus on two continents, and the scaly skins of specimens from the Malay Peninsula (*Manis javanica*), and the South African species on which Mr. Marshall has written, are before me now. The word Pangolin is derived from the Malay *Peng-goling*, signifying the animal which rolls itself up.* The contents found in the stomachs of these animals in the east are identical with what Mr. Marshall discovered in his South African species. Cantor found the stomach of a *M. javanica* extended by the remains (head and legs) of large black ants, and also "five small rounded fragments of granite."† In the Ceylon species (*M. pentadactyla*) Tennant found a quantity of small stones and gravel, "which had been taken to facilitate digestion."‡ Mystical properties are also ascribed to the animals in the east. Diard and Duvaucel, writing from Bencoolen, state that, owing to the wonderful medicinal properties attributed to their scales and nails by the natives, they found it very difficult to procure specimens.§ In the Indian highlands, Ball relates that the prevalent native idea is that the creature is a land-fish, and that its flesh has

* Marsden, 'Sumatra,' p. 118.

† 'Cat. Mammalia, Malayan Peninsula and Islands,' J. A. S. Beng. vol. xv.

‡ 'Nat. Hist. Ceylon,' p. 47.

§ Cf. Miscell. Papers relating to Indo-China and Ind. Archipel. ser. 2, vol. ii. p. 201.

“aphrodisiac properties.”* In Sumatra the scales are valued by the natives for their medicinal qualities.† In Borneo, according to Bock, their flesh is highly esteemed by the Chinese.‡ Hornaday, of a body “made a delicious stew, rich, sweet, and well-flavoured, and part of it we roasted.”§ I could always procure living specimens when living at Province Wellesley in the Malay Peninsula, but never succeeded in keeping them alive in captivity.—ED.]

A V E S.

Sparrow-Canary Hybrid ?.—At Frampton Cotterell, Gloucestershire, last June, a bird was shot from among the Sparrows on a farm, of which the following is a description:—General colour yellowish white, dusky on the head and throat, and with a few dark marks on the back. Tail and tail-coverts exactly like those of a *yellow* Canary; bill and legs like a Sparrow’s for shape and size, but pinky white. It appeared to be one of a brood. One or two other Sparrows seen at the same time were described as being nearly or quite white.—H. J. CHARBONNIER (Redland, Bristol).

Crested Lark, &c., released in England.—Having recently obtained from India a consignment of the Crested Lark (*Galerita cristata*), I liberated nine specimens—a few having died—in Kent on Aug. 24th, letting them out from the train at various points. Most of them went off strongly, but they are rather rough in feather, though in good condition of flesh. I much hope that some pairs will survive and breed, as this interesting species certainly ought to be acclimatized with us, instead of persecuted. On the same day I let out, in the Zoological Gardens, a pair of Black-headed Buntings (*Emberiza melanocephala*), which I had procured from a London dealer. The cock was in perfect condition, and could not be recognised as a caged bird; the hen was moulting rather unkindly, but I thought her more likely to recover if turned out now. This beautiful species particularly deserves to be encouraged, as it is far the finest of the Buntings; any number could be purchased at Bombay in the spring. A few, as is well known, have occurred here. On the last day of July I had released in the Gardens a Rosy Pastor bought in London, which soon vanished. It was perfect in feather, but had a slight malformation of the beak, and two or three

* ‘Jungle Life in India,’ p. 335.

† Marsden, ‘Sumatra,’ p. 118.

‡ ‘Head-Hunters of Borneo,’ p. 246.

§ ‘Two Years in the Jungle,’ p. 271.

nails missing, which would render it recognisable if met with anywhere. I have a good many of these birds on deposit at the Calcutta Zoological Gardens, and hope to have them forwarded shortly. Should it prove possible to liberate them on arrival, I will of course notify the fact of my having done so. — FRANK FINN (c/o Zoological Society, 8, Hanover Square).

Habits of *Alcedo ispida*.—While fishing on the old river Kennet, at Theale, about five miles from Reading, on Aug. 7th, I had the pleasure of seeing a Kingfisher going in and out of its hole to feed its young; but the point of my writing is to mention that each time it came out it dived immediately into the stream, and then flew away. My only explanation of its conduct is that its plumage was more or less soiled from the dirty state of the passage to the nest, in which there were four young nearly ready to fly.—GEORGE W. BRADSHAW (Reading).

An unrecorded Kite obtained in Huntingdonshire.—Recently I have been able to examine a Kite (*Milvus iclinus*) that, I am informed, was killed by a Mr. Ullet, of Higney Grange, near Holme, and given to a relation of his, a Mr. Norman, then living at Blunham Mill, in the adjoining county, Bedfordshire. At the back of the case it states: "Preserved by I. Wright, of Kimbolton." It was most probably stuffed in 1836, as at the back of the case a portion of newspaper is affixed bearing this date.—J. STEELE-ELLIOTT (Clent, Worcestershire).

Variety of the Shag.—A curious variety of *Phalacrocorax graculus* has been shot on Arran Island, Co. Galway, and sent to us for mounting. Instead of the ordinary dark green plumage of the back and wing-coverts, this specimen is pale buff-colour, shading into almost white at the extremity of the wing-coverts; back, tail, throat, and breast, beak, feet, and bare space around eyes ochreous brown; irides pale bluish grey. The bird was a female, and in excellent condition. WILLIAMS & SON (2 Dame Street, Dublin).

The Little Bittern in Cornwall. — On June 30th last a Little Bittern (*Ardetta minuta*), with a broken leg, was taken in a public resort at Lostwithiel, Cornwall, known as "The Parade," after being seen about the same spot for some days. It was in a very weak condition, and efforts to revive it having failed, the bird was preserved by a local taxidermist named Higgs, and very well set up. The sex was not noted by him, but the black crown, nape, and back indicate an adult male. The river Fowey encircles a great part of "The Parade," and is bordered by a good deal of marsh-land. The railway runs close to the river, many water-birds being maimed by flying against

the telegraph-wires, and it is probable that the injury to this one was caused in the same way. It seems lamentable that the Little Bittern cannot regain its status as a nesting species in England. The specimen I am recording has been acquired for the Devonport Public Museum.—H. M. EVANS (Plymouth).

Puffin off the Coast of Kerry.—A Puffin (*Fratercula arctica*), pure white, with the exception of the wings, which are of the ordinary colour, was obtained off the coast of Kerry. The bird presented a very striking appearance after death, the colouring of the beak and legs showing strongly against the snow-white plumage of the back, head, and breast. The bird was a male.—WILLIAMS & SON (2, Dame Street, Dublin).

The Origin of the Name "Fulmar."—I am sorry to have delayed my reply to Mr. Meiklejohn, but I did so in the hope of being in town, and having an opportunity of fully ventilating this subject. There can be no doubt that the term "Fowmart" was constantly applied to the Polecat, because we have abundant proof of it in old Scottish documents. But that the term of Fowmart or Foul Mart came to be transferred to the Fulmar is, to my mind, improbable. The great 'Dictionary of the Gaelic Language,' published by the Highland Society in 1828, is the only Gaelic dictionary I happen to possess. It accepts the term *Fulmair* as a Gaelic term without question. I should have expected this, because Prof. Newton, the late Mr. Robert Gray, and other eminent naturalists have done the same. The actual origin of the Gaelic name *Fulmair* or *Falmair* is a question for experts to settle. Maclean supplies the very simple explanation that *Fulmair* signifies sottish or stupid ('Sketches of the Island Saint Kilda,' p. 8). This would suit the bird appropriately enough, in view of its apparent stupidity in allowing a noose to be dropped over its head. Jamieson suggests that the term *Fulmar* may bear some analogy to the Danish name *hav-hest*, i. e. sea-horse; for the Icelandic *fula* signifies a *foal*, and *mar* signifies the sea ('Scottish Dictionary,' vol. ii. p. 319). I hope that some more competent authority may perhaps be induced to clear this matter up. At all events, I think we may dismiss the suggestion that the *Gaelic* *Fulmair* is identical with *Foulmart* or *Foumart*; unless, indeed, some strong corroborative evidence can be supplied.—H. A. MACPHERSON (Pitlochry).

REPTILIA.

The Sand-Lizard in the North of England.—In the recent volume of the Cambridge Natural History on "Amphibia and Reptiles,"

Mr. Hans Gadow says that the Sand-Lizard (*Lacerta agilis*, Linn.) "is absent in Ireland and Scotland, while in England it is restricted to the southern half"; and a similar statement is made by Mr. Boulenger in the Hampshire volume of the Victoria History of the Counties of England. The reputed Sand-Lizards, frequently reported from northern counties, generally prove, on investigation, to be large examples of the Common Lizard (*L. vivipara*). This, however, is not the case in Lancashire, and, I believe, in Cheshire, for on the coast sand-hills the true Sand-Lizard was formerly common, and may even yet occur in places where the sandhills are unreclaimed. Lancashire naturalists of the old school knew the Sand-Lizard well, but, as questions of geographical distribution did not greatly interest them, there are few records left beyond the bare fact that the species was common. There are, however, specimens in the Warrington Museum, whose identity Mr. Boulenger has confirmed, which were captured at Southport and Formby, on the Lancashire coast. In Mr. Isaac Byerley's 'Fauna of Liverpool,' published in 1856, the Sand-Lizard is described as occurring "on the sand-hills from West Kirby to New Brighton" (in Cheshire). "At Seaforth, Crosby, and elsewhere" (in Lancashire). Mr. W. D. Roebuck states ('Naturalist,' 1884-85, p. 258) that, after examining specimens sent to him from various North of England localities, and finding that they were only "lightly coloured specimens of the Viviparous Lizard," he did not believe in the existence of the true *L. agilis* so far north, until Mr. G. T. Porritt procured him a couple of specimens from the Southport sand-hills, which he "at once saw were unmistakably referable to that species." He adds:—"Mr. Porritt tells me these Lizards swarm on the sand-hills at Southport, where he has frequently seen them sparkling in the sun with a glistening emerald-green, and sometimes almost golden, brightness." The late Thomas Alcock, in his pamphlet on the 'Natural History of the Coast of Lancashire' (1887), also speaks of the Sand-Lizard at Southport, where he says it was "formerly plentiful on the isolated group of sand-hills at the north end of the town. Hesketh Park, however, now occupies the best part of this locality." In 1862 and 1865 he captured and received a number of examples from this place. Mr. H. O. Forbes, in the 'British Association Handbook' for 1896, says, on the authority of Mr. Linnæus Greening, of Warrington, "Common; Wallasey, Southport, and Formby sand-hills." The Cheshire locality is included on the strength of specimens which were shown to Mr. Greening by the late C. S. Gregson, who stated that he had obtained them at Wallasey. The sand-hills between West Kirby and New Brighton were of the same

character as those extending along the Lancashire coast from Liverpool to the mouth of the Ribble, and it is a generally accepted theory that the river Mersey, within geologically recent times, used to empty itself into the sea considerably to the west of its present mouth; so that at one time the Wallasey coast-line was north of the river. The spread of the suburban residential districts round Liverpool, the growth of seaside resorts such as Hoylake and West Kirby, and the formation of golf-links all along the coast have destroyed a large portion of these sand-hills; but there are considerable stretches in both counties where the Lizard may still exist. The Sand-Lizard is not known in Cumberland or Westmoreland, and, although many miles of the North Wales coast, from the mouth of the Dee westward, are, or were, similar in character to the Cheshire shores, I know of no record of the Sand-Lizard from the Principality. The evidence therefore shows that *L. agilis*, generally considered to be only an inhabitant of some of the southern counties, occurs in the north, on a strip of sand-hills bordering the Irish Sea, from the mouth of the Ribble to the outskirts of Liverpool, and, unless Byrley's and Gregson's specimens were incorrectly localized, on the Cheshire shore from West Kirby to New Brighton. Possibly some of the readers of 'The Zoologist' may be able to give information about existing specimens, or of recently captured examples of the Sand-Lizard in Cheshire.—T. A. COWARD (Bowdon, Cheshire).

INSECTA.

A Dipterous Parasite in the Plumage of Birds.—I enclose herewith some flies which I obtained from among the plumage of a Blackbird caught in a net protecting raspberries on Aug. 5th last at Balcombe, in Sussex. I should be interested to know the name of the fly, and also if its habit of infesting the plumage of Blackbirds and Song-Thrushes is known.—ALFRED T. COMBER (3, Worcester Terrace, Reigate, Surrey).

[This fly has been identified as *Ornithomyia avicularia* by Mr. E. E. Austen, who has added the following note.—ED.]

Ornithomyia avicularia, Linn.—This fly, a near ally of the so-called "Forest Fly" (*Hippobosca equina*, Linn.), which is exceedingly troublesome to Horses and Cattle in the New Forest, and of the Deer-Fly (*Lipoptena cervi*, Linn.), a parasite of the Roe- and Red-Deer, appears to occur indiscriminately in the plumage of most wild birds. The series in the collection of the British Museum includes examples from the Thrush, Red-backed Shrike, Wheatear, Whitethroat, Starling, Pheasant, Partridge, Red Grouse, Ryper (in N.W. Norway), Blackcock,

Snipe, Long-eared Owl, and Green Woodpecker. *Stenopteryx hirundinis*, Linn., another member of the same group of flies, found only in the nests and upon the young of the House-Martin, is very similar in general appearance, but has lancet-shaped wings; while *Oxypterum pallidum*, Leach, has somewhat broader wings, and is confined to the Swift. The so-called "Sheep-tick" (*Melophagus ovinus*, Linn.), which is entirely destitute of wings, also belongs to this group.

The mode of reproduction of these flies is highly remarkable. The female is viviparous, and produces but a single larva at a time, which grows to a large size within the body of the mother before being extruded, being actually nourished by means of a sort of *placental* connection with the wall of the oviduct. As soon as it is deposited the larva turns into a dark brown shining pupa, whence the group of parasitic flies, to which *Ornithomyia* belongs, has been termed the *Pupipara*. Recently, however, a similar mode of reproduction has been stated to occur in the case of the Tsetse Fly (*Glossina*), which is a true Muscid, and a near relation of our common English *Stomoxys*; so that, if this is confirmed, the name *Pupipara* must be abandoned.—E. E. AUSTEN (Brit. Mus. South Kensington).

NOTICES OF NEW BOOKS.

Essays and Photographs. Some Birds of the Canary Islands and South Africa. By HENRY E. HARRIS. R. H. Porter.

A TRIP to South Africa is always enjoyable, especially if a halt is made at the Canary Islands, which can now be easily done by travelling on board one of the intermediate steamers of the Union-Castle line. Mr. Harris has visited both spots as an ornithologist, relying on his camera and not on his gun for the spoils he brought home, which constitute the photographs supplying the material for fifty-five plates. These illustrations alone were well worth publishing, but the author has also supplied some excellent field observations, especially as to nesting habits.

Mr. Meade-Waldo has already published a list of the birds to be found on the Canary Islands, and Mr. Harris has now written a good supplement on a different branch of the science. Nature has not exhausted herself on these islands. We have sailed along the coast of Fuerteventura, but even then did not realize the grandeur of its dreariness as we have by reading some of the pages in this book. It is the fate of most travelling naturalists to visit a region at a wrong or disappointing season, and not to do all that was expected. Mr. Harris seems to have had a similar experience, but he secured photographs of many nests and eggs, that of the Houbara Bustard being one of the most charming and realistic.

In South Africa, Mr. Harris found his happiest hunting-ground in the neighbourhood of the Knysna Forest, a region far too little visited by either ornithologist or entomologist. We are glad to see illustrations of the nest and eggs of the Secretary Bird, and the nesting site of the Hammerkop, though both require larger space than can be afforded in any ordinary book to give a real impression of their massive structure. The author also paid considerable attention to the shore-nesting birds, and gives instances of the intelligent manner in which some Plovers seek

to render their eggs almost indistinguishable from their environment, *Egialitis pecuaria* being a good example of this practice, and its nest is well-illustrated. As we look over these interesting illustrations, we feel that in regions where the birds have been collected and identified the old days of killing and skinning may be considered as closed. The work of the camera has only just commenced, and we would commend to those who have the opportunity, the great possibilities in going over the ground of the old naturalist travellers, provided only with the means of photography. 'The Camera on the Amazons,' the 'Photographer in the Malay Archipelago,' are books we would fain see and read.

A Descriptive Catalogue of the Indian Deep-Sea Crustacea. Decapoda: Macrura, and Anomala, in the Indian Museum, &c.
By A. ALCOCK, M.B., LL.D., &c. Calcutta: printed by order of the Trustees of the Indian Museum.

THIS is another result of the good work accomplished on board the Royal Indian Marine Survey Ship 'Investigator.' In our last volume we noticed a similar publication referring to the Deep-Sea Brachyura and Indian Deep-Sea Fishes, and we now receive an enumeration of the Crustacea. But this is more than an enumeration, seeing that full descriptions of all the species are given; in fact, we have a monographic account of the results of an expedition that is a real evidence of an enlightened administration. Like all sectarians, zoologists must—apart from the larger questions—judge governmental departments by the support they give to their own cause. Whether imperialists or republicans, the duty of all zoologists is to see that science is not neglected by the State. A voyage of the 'Challenger' is far more important to us than the measures which seem often designed by well-meaning legislators to show their incapacity for recognizing the trend of evolutionary progress. The work of the Royal Indian Marine Survey Ship 'Investigator' covers a multitude of infirmities in Indian administration, and Dr. Alcock is to be congratulated on the valuable use he has made of his opportunities.

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DANTE AS A NATURALIST.

BY J. L. BEVIR, M.A.

THERE is one peculiarity of Dante that has struck all readers of the ‘*Divina Commedia*,’ and that is his desire throughout to be exact in his descriptions. It may not be uninteresting, therefore, to consider what he has to say on the subject of natural history. He uses animals allegorically as part of the *dramatis personæ* of the ‘*Commedia*,’ and he often refers to them in simile. In so doing, we find that he may be merely taking some generally recognized characteristic of a beast, or describing it accurately from personal knowledge, and the value of his remarks will vary according as he is speaking from his own experience, or from what he has accepted from others.

The best division under which to consider them will be foreign animals, and those which he has met with in Italy. Of the first class—foreign animals, as one might expect—his descriptions are for the most part general. For instance, in the first canto of the “*Inferno*,” the Lion—the emblem of pride—has nothing very special about it as it advances “with head uplifted, and with ravenous hunger.” He may have seen one in some ducal Lion-pit, but the description of it might as well be a reminiscence of some heraldic imaging of the beast, to which all the other references are to be attributed, with the exception of

(Inf. xxxi. 118) the passage where he is speaking of Antæus gathering a thousand Lions as sport; and there he is merely quoting Lucan.

Of other foreign beasts, he makes allusion to the Elephant and Whale, both in speaking of the giants that rise around the ninth circle in the "Inferno" (Inf. xxxi. 52), where he makes the quaint remark that Nature did well to give up forming such creatures as the giants; and if she does not repent of Elephants and Whales, it is because they have not the intelligence to do harm; wherein Dante shows that he does not appreciate the intelligence of the Elephant, and perhaps, Mr. Bullen would add, of the "Cachalot."

Of other foreigners, he mentions the Bear, but only in reference to Elisha; the Ape and the Pelican, both in a conventional way.

Perhaps under this heading we should include his allusion to the Bivero or Bevero (Inf. xvii. 22).

Dante and Virgil have come to the margin of the eighth circle, whence they are to descend on the back of Geryon to the ninth. The monster, with a human head, paws, and a serpent's body, came up, and thrust on shore its head and bust; "but on to the border did not drag its back." The poet compared its position to that of a Beaver, "who among the guzzling Germans plants himself to wage his war" (upon the fish). Obviously Dante did not know the animal intimately, and, like many an Englishman of the present day, who fails to distinguish between the Sewer-Rat and the Beaver's humble representative the Water-Rat, accepted the common view which confused the fish-eating Otter with the rodent Castor. This is clearly brought out in Boccaccio's note:—"Bevero, the male Otter: this animal is very fond of fish; therefore it takes its stand on the banks of the Danube, puts its tail, which is very thick, into the water, and, because there is much fat on it, an unctuous matter exudes from it, by which the water is covered, as it were, with oil. To this the fish come, and the Beaver turns round and takes his pick of them"—a neatly concocted theory, from the way in which they have seen the Beaver sitting, and the shining greasy look of its tail. Had he seen a Norwegian landing fish with an oar, he doubtless would have let the Biber bring the fish to land in more

sporting way, without turning round, Dante, however, knows what an Otter looks like, for (Inf. xxii. 36) he compares a baron of Thibault, King of Navarre, when he is being dragged out of the boiling pitch, to one—which is a very good simile.

This completes the list of extraneous animals, unless the Lynx be included; for some would have it that it is the Leopard, or the Caracal, that Dante intends by the Lonza, which he selects as representing worldly pleasure, on the one hand, and Florence, torn by the factions of the Bianchi and Neri, on the other. Set us look at what he says of it (Inf. l. 32):—

“Une lonza leggiera et presto molto,
Che di pel maculato era coperta;”

and again (Inf. xvi. 108), “la lonza alla pelle dipinta.”

There is no doubt as to what he would set before us—some quick-stealing feline animal with a mottled coat; and probably he is following his master Virgil, who speaks twice of “variae lynces,” which take us back to the βαλιδαι λύνες of the ‘Alcestis.’ It is hence that several commentators, going back to the fact that Lynces were the satellites of Bacchus, and that in the classics the idea is associated with India, while at times the word Tiger is used, determine that the word Lynx here must mean either the Leopard or the *Felis caracal*, which are not European specimens. I cannot see why it should not be the *Felis lynx* (the Common Lynx), which was to be found in most parts of Southern Europe; an animal with long fur of dull reddish grey, marked upon the sides with oblong spots of reddish brown, which become round and smaller on the limbs; the lower part mottled with black and white. This seems to suit the “pelle maculata” and “dipinta”; while Boccaccio’s tale that, when one was being led through the streets of Florence, the boys followed it, and called it a “pard,” shows how commonly the two were mistaken. It is not at all impossible that Dante may have come across the beast on some hunting expedition, and that it should have been included in the second division—that of animals with which Dante met in Italy.

Under this head I will first consider those which he met in the chase. The most important of these are the Dogs, of which one knows a good deal from pictures by early masters, and

perhaps the simplest way of approaching the subject would be to glance at the Dogs which one finds there.

The reader will be able to supply from his own knowledge many mediæval pictures containing Dogs. I will only take one by Vittore Pisano, who was born in 1380—a picture which all will know, as it is in our National Gallery. It is the Conversion of St. Eustace. He, like St. Hubert, meets a Stag with a crucifix between its horns. Eustace is on horseback. Near him are two Dogs of mastiff breed, and one that is a kind of staghound. In front are two setters; to the right two magnificent greyhounds pursuing a Hare, which is bolting for a wood which contains a Brown Bear; on the left the heads of two big hounds with drooping ears, obviously of the nature of bloodhounds. In this picture are to be found most of the recognized breeds of mediæval Italy. The commonest of them is Veltro, the greyhound—the Vertagus of Martial—that was trained to bring to his master the Hare unhurt. It is of them that Dante speaks where he tells of the pursuit of Lano and his friends through the wood of human trees (*Inf.* xiii. 126). He says the Hell-hounds come on like greyhounds let out of a leash; and again (*Inf.* xxiii. 18), more cruel than a Dog to a Hare, which it seizes in its teeth. The greyhound was used for pursuing, but did not find game. For this purpose a kind of setter was used. He marked the Hare for the greyhound, and put up the birds for the Hawk. The Dog was called Bracco, whence the French Brague, and does not occur in the 'Comedy'; but Dante, in the "Convito," says every excellence in everything is to be desired, "*Siccome nel bracco il bene oderare, nel veltro il bene correre.*"

He is speaking of a bigger breed of Dogs in Ugolino's dream (*Inf.* xxxiii.), where the latter saw the Archbishop hunting the Wolves and whelps upon the mountain ("*con cagne magre studiose et conte*"), which Longfellow translates, "With sleuth-hounds gaunt, eager, and well-trained." They were probably a breed of mastiffs ("*mastini*," the Roman Molossus), which were used also for catching thieves (*Inf.* xxi. 44). It was with these that Nastigio degli Onesti saw his phantom ancestor Cavalcante hunting the fair Lady Disdain in the woods of Chiasso, near Ravenna. This breed originally came from Epirus, but there was a bigger one still coming from Sarmatia, known as Alano; so much stronger,

that Ariosto, in the last scene in the 'Orlando Furioso,' where he is describing the Saracen pinned down by Ruggiero, says:—

“ Come mastin sotto il feroce alano,
Che fissi i denti ne la gola abbia.”

This is all Dante has to say of hounds, and I will therefore turn to their quarry.

Of Wolves he often speaks; they are to him the symbol of avarice, either of the Florentines (Purg. xiv. 50), or of the Popes (Par. ix. 132); nor could any animal better describe insatiate desire that derives no benefit from getting. Two passages in particular give one a perfect picture of the beast (Inf. l. 49): She-Wolf (“Chi ditute brame Sembiava carica nella sua sembianza”); and again he speaks (Purg. xx. 10) of the limitless hunger of the “old she-Wolf, who more than all the beasts has prey” (“Per la sua fame senza fine cupa”). We have a sketch, too, of the Wild Boar (*porco*), which modern Italian keeps for the domestic Pig, using *cinghiale* for the nobler animal. He tells us of its tusks, and describes the noise a Boar-hunt makes (Inf. xiii. 113) as beast and dogs come crashing through the branches. Apparently they did not hunt the Fox, for the only allusions to the Volpe refer in a general way to his cunning (as when he speaks of the Pisans (Purg. xiv. 53), but they hunted the Deer (*dama*) (Par. iv. 6)). In an amusing passage he alludes to it. He says his mind was so evenly divided that he is like a man free to choose between two kinds of food equally removed and equally tempting, who would die of hunger; and so would stand a hound between two does. Few now quote this simile, for to our generation Heine's Donkey between two bundles of hay is better known.

Whatever Dante's enjoyment of the chase may have been, there can be little doubt that he preferred hawking. According to Plumptre this pursuit, which had been lately introduced into Italy by Federigo II., formed part of Dante's education, and he had probably read a copy of Frederic's work on hawking, which existed in manuscript with hand-painted pictures, and must have been in a way to that age what Gould's 'Birds' has been to ours.

This we gather from the way in which he used terms in falconry, and from the fact that by piecing together his different similes we have a very fair picture of the sport. He says, for

instance (Inf. iii. 117), that the damned souls rush to Charon, when he signs to them ("come augel per suo richiamo"), like a Falcon to his call. That is the exact meaning of "richiamo," the sound made by the falconer, which from its earliest training the bird associates with the idea of food; it is sometimes used as the equivalent of "logoro," lure (Purg. xix. 62); the German Federspiel, made of leather with feathers attached, from which the Hawk is fed, that it may learn to connect with it the sight of its food, and may come back to its master if it found no bird. From what Buti says, occasionally actual birds were used for the lure, differing according to the kind of Hawk employed.

Falconers recognized two kinds of birds. First, the long-winged or proper Falcons, of which class the Gyrfalcon and the Peregrine (*Falco peregrinus*) were the ordinary representatives. Of these the Gyrfalcon, a big bird, inhabits Northern Europe only, and does not seem to have been imported till later into Italy for sporting purposes; while the Peregrine is the Falcon of Dante that figures in many similes. The second class consisted of the short-winged, and were generally represented by the Goshawk (*Falco gentilis*)* and the Sparrow-Hawk (*Sparvius*).† Dante knew both. He speaks of the two guardian angels of the quiet valley in the "Purgatorio" as "astore" (Purg. viii. 104), which is the Goshawk, and he has much to say of the "sparviere" (épervier). He notices it with regard to the common custom of the short-winged grappling their quarry instead of striking it dead, for, in speaking of the two demons fighting (Inf. xxii. 139), he says that one

"Fu bene sparviere grifagno
Ad artigliar ben lui."

He also alludes to a method of taming the wild Sparrow-Hawk, for the envious in Purgatory expiate their sins by having their eyelids fastened together with iron wire (Purg. xiii. 71), "as is done to a wild Sparrow-Hawk, because it will not keep still"—a mode of treatment recommended by Frederic.

To turn to the sport itself. We have a picture of the process (Par. xix. 34). The start: the Hawk, on having his hood removed, shakes his head and flaps his wings (coll' ali si applauda), showing his eagerness, and making himself fine. Next (Purg. xix. 64) he surveys his feet, then turns him to the call (of the

* *Astur palumbarius*.

† *Accipiter nisus*.

falconer), and "darts forward through strong desire for food that draws him thither." He wheels up into the air (Par. xviii. 45), carefully watched by the eye of the falconer. He spies his quarry, and makes for it. The only actual instance we have is in Inf. xxii. 131: this time a Duck, that at the Falcon's approach dives under, and comes up cross and weary. A very good description. I watched a big Hawk once in Norway that was dividing its attentions between a Heron and a Duck, neither of which left the sea-pool where they were. The Hawk settled on a tree in a small island, and kept sweeping down on first one and then the other. There was a great deal of shrieking, and the Heron baffled it by its flight, and the Duck by diving, coming up each time, one might judge from the sounds it emitted, distinctly cross and weary (Inf. xvii. 127). In Dante's simile of the approach of Geryon, we have a picture of the disappointed Hawk:

"E'en as a Falcon long upheld in air,
Not seeing lure, or bird upon the wing,
So that the falconer utters, in despair,
'Alas, thou stoop'st!' fatigued descends from high,
And, whirling quickly round in many a ring,
Far from his master sits—disdainfully."

With this ends Dante's allusion to sporting; but, as the modern Italian, who goes *alla caccia* with his gun and his game-bag, shoots for the pot, and spares neither Yellowhammer nor Wag-tail, perhaps this would be the place to mention the professional "che dietro all' uccello sua vita perde" (Purg. xxiii. 3). He apparently crept up, and looked cautiously through the leaves, and then took a sitting shot; for we are told (Purg. xxxi. 61) that the young inexperienced bird will wait till he has had two or three shots, but at the *full-fledged* (pennuto) it is no good shooting, and in vain is the net spread in its sight. The latter part is a quotation from the Book of Proverbs, "*frustra jacitur rete ante oculos pennatorum*" (an equivalent of "Old birds are not to be caught with chaff"), which in our version has been reduced to nonsense by translating (pennati) as "any bird."

Domestic animals and cattle next claim attention. Of the former, we have the Cat pursuing the Mouse (Inf. xxii. 58), and four allusions to Dogs. In the first, as in Calverley, "the Dog said nothing, but searched for fleas." He is describing the

usurers, who are worried by the fiery flakes that fall upon them, and are trying to remove them (Inf. xvii. 49) :—

“Non altrimenti fan di state i cani
O col ceffo, o coi pie, quando son,
O da pulci, o da mosche, o da tafani morsi.”

We are next introduced to him gnawing a bone (Inf. xxxiii. 78), and then we see the faithful House-Dog flying at a tramp (Inf. xxi. 68), and, lastly, the impotent cur (botolo) snarling at the passer-by (Purg. xiv. 46). I can find no allusion to the Sheep-Dog, which is surprising, especially when Giotto has left us the picture of such a fascinating little puppy in his carving of pastoral life on the tower of the Cathedral at Florence. But, though he is not mentioned, the Sheep (“pecore pecorelle agnelli”) are alluded to on several occasions. I always imagine them to be Giotto’s Sheep, not the great big specimens with which one meets in England. He describes the sportive lamb (Par. v. 82), that leaves its mother’s milk, and frolicsome and simple, combats at its own pleasure with itself. He speaks of them, as did our early poets, as the “silly Sheep” (Par. v. 80), but they supply him with two of his most fascinating similes. The first is a long one, describing a frosty morning in early spring, and the shepherd driving out his flock. There is such an atmosphere about it; it reminds one of Turner’s ‘Winter’s Morning’ (Inf. xxiv. 1). It is getting near the equinox; the hoar-frost on the ground looks like snow, but soon evaporates.

“The rustic now exhausted his supply,
Rises betimes, and looks out, and sees the land
All white around, whereat he strikes his thigh,
Turns back, and, grieving, wanders here and there,
Like one disconsolate, and at a stand;
Then issues forth, forgetting his despair.
For, lo! the face of nature he beholds
Changed on a sudden—takes his crook again,
And drives his flock to pasture in the folds.”

Again, he gives us an accurate picture of them (Purg. iii. 79), where they come out of the fold by ones and twos and threes; and others stand timid, turning their eyes and noses down to the earth; and whatever the foremost one does, so the others do, huddling close up to it if it stops, simple and quiet, and do not

know any reason for what they do. An excellent simile to describe a crowd blindly following their leader, and one which he repeats in slightly altered form in the "Convito," l. 11.

We have been speaking as yet of Sheep; they are to be distinguished (Par. ix. 131) from the Goats, for which we have three names—"capra," "becco" (German, Bock), and (Inf. xxxii. 15) "zeba," from "zibbe," a corrupted form of the German "Ziege"; these he has watched climbing over almost impossible ways (Inf. xix. 132), as one sees them in Corsica, often to one's imminent peril, if one is walking on the road below, or butting each other with their heads down (Inf. xxxii. 50) ("come due becchi, cozzaro in sieme"); or quietly chewing the cud watched by their shepherd (Purg. xxvii. 76), "just as the Goats become quiet while ruminating, which had been agile and venturesome upon the mountain tops before they took their meal, resting hushed in the shade while the sun is hot, watched by their shepherd, who leans upon his staff." I have quoted Vernon's translation. He agrees with Longfellow in translating "proterve" venturesome. I should be inclined to think it was more likely a reminiscence of "hædique petulci" of Virgil. Of other cattle, we have "bue" and "toro"; the former obviously the meek-eyed, long-horned Oxen (Purg. xxxii. 145), which it is so hard to pass in a narrow street of some old Tuscan town as they sway their heads from side to side beneath the yoke (Purg. xii. 1) while they drag the rough carts full of wine-casks and other agricultural produce. The poet gives one quaint touch with regard to them (Inf. xvii. 75) when he makes the great usurer Scrovigni distort his mouth, put out his tongue ("come bue chi il muso lecchi"). He has nothing interesting to tell us about bulls. One passage (Inf. xii. 22) is an adaptation of a simile of Virgil, with regard to the sacrificial bull that reels from the stroke it has received; the other (Par. xvi. 70) tells us that a blind bull falls more headlong than a blind lamb—which, though true, does not add much to our knowledge.

It is worth while to turn for a moment to Dante's reptiles before considering his birds. The Frog is mentioned several times. He alludes to Æsop's fable of the fight between "Il Rana e Il Tope," the latter of which obviously comes from "talpa," and originally meant "mole," but is here used for Mouse. The Frog appears also in the description of Caina (Inf. xxxii. 31), and of

the fifth Bolgia in the "Inferno," in which the judges who take bribes for giving judgment squirm in a marsh of boiling pitch, over which Graffiacane and other such demons wheel on ponderous wings. The wretched souls would fain get respite by emerging from the pitch, and so (Inf. xxii. 25)—

"As on the brink of water in a ditch,
The Frogs stand only with their muzzle out,
So that they hide their feet and other bulk;
So upon every side the sinners stood."

But not for long. The warder demons, when they see them, swoop down upon them, at whose approach they mostly plunge again into the pitch, though Dante saw one wait, "as one Frog remains, and another dives down." We have, too, the description of the accursed souls that fly before the approach of the celestial messenger, who strides dry-shod across the Styx (Inf. ix. 76), "even as Frogs disappear in all directions across the water before the (biscia) snake, till they are huddled all together on the land."

This brings us to the consideration of snakes, for which he used as generic names "serpe" or "serpenti," crawling animals. Since the thieves in Hell (Inf. xxiv. 82) are punished by snakes, he gives us a grand selection. He says there were more there than could be found in the deserts of Libya or in Ethiopia, or above the Red Sea.

"Chelidri, iaculi e faree cencri con amphisbena."

Not unlike Milton's list (Par. Lost, x. 525)—"Asp and amphisbœna dire"—

"Cerastes horned, hydrus and ellops drear."

In other passage, speaking of the Furies (Inf. ix. 41), who

"Con idre verdissime eran cinte,
Serpentelli e ceraste avean per crine."

As a whole they are more interesting as mentioning the snakes known to the ancients than for any other reason, for they come from Lucan's 'Pharsalia,' and are to be found in Pliny's Natural History; but some of them are probably Italian, for Virgil speaks (Geo. xi. 214) of "nigris exesa chelydris creta," which may have been *Tropodonatus tessellatus* and *viperinus*, both Italian snakes, that live almost exclusively in the water, and feed on fish.

The *Jaculus* is found in Greece, and may in old times have been found in Italy, though there is no record of it; it is an unpleasing little reptile that hurls itself at one from a tree. He is speaking more from observation (*Inf.* xxv. 53) when he speaks of

“Serpentello acceso,
Livido e nero come grar di pepe”;

a fiery little serpent (fiery in the Biblical sense, that is to say, venomous), partly dark green, partly black. A very good description of the Adder, by one of which I was nearly bitten in the nose one hot day in June when I stooped to bathe my face in a stream near San Gimignano. The little beast was sitting coiled up in the water, with only its head protruding. Both it and the ordinary Grass-Snake very often take to the water, even in England. In White's ‘Selborne,’ he says they will stay under water in search of food. There is no doubt that both species frequent damp places where Frogs and the like abound, and will swim after them, if their quarry take to the water. This brings us back to the *Biscia*, which perhaps should have been included in the generic name for snakes, for the word is onomatopœic to represent the hissing animal, an idea which Milton conveys by the frequent repetition of sibilants when describing snakes. Here it is probably the Common Grass-Snake. Dante had seen such chasing Frogs in the swamps around Ravenna, to which the passage above quoted refers; and he says that *Cacus* had around his chest more snakes than he would have believed could have been found in the *Maremma* (*Inf.* xxv. 19), that other marshy district on the west coast of Italy, part of which was drained by Napoleon, part planted more recently with eucalyptus. There are several other references to snakes, but they are not worth anything from the naturalist's point of view, except the one that invaded the happy vale in Purgatory (*Purg.* viii. 98); for, though he gives a fabulous touch to it by saying, “possibly it was the one that gave the bitter fruit to Eve,” yet it is drawn from life; for he says that it pursued its way through the green grass and bright flowers, turning every now and then its head towards its back, and licking like a beast does when it smooths its coat. A description from which Milton has borrowed (*Par. Lost*, ix. 525).

He mentions other reptiles, but they are fabulous, with the exception of the Lizard—the bright southern creature, not the dull brown reptile of our heath-lands. He speaks of it as darting from hedge to hedge in the blaze of the summer sun like a flash of lightning (Inf. xxv. 79)—

“ Come il ramarro sotto la gran ferse,
Ne’ di canicular cangiando sepe,
Folgore par, se la via attraversa.”

And now I come to birds; and it is here that the poet is at his best. One almost hesitates to deal with them, for Dean Church has already touched upon sundry of the poet’s similes with regard to them; but I will venture to go on, for there is still something to be said, even though I must go over part of the ground which he has covered. The words he uses for birds are derived from “avica,” or its diminutive “augello,” “uccello,” and “oca.” The latter is interesting. It properly means a bird, but in modern Italian is only used for goose. I have come across an analogous case in Norway, where in a certain district they employ the word “om”—which merely means fowl—to the Shoveler. “Oca” only occurs once in the poem, and there merely as a crest on the pouch of one of the usurers (Inf. xvii. 63); on a red ground was blazoned “un oca bianca piu che burro,” which would seem to refer to the goose.

As throughout the poem Dante has to allude to masses of souls floating in the air, it is only natural that he should frequently compare them to birds—for instance (Inf. v. 40), the pack of Starlings. The migratory birds that he had watched going south in autumn and north in spring furnished him with many suitable comparisons. Of these he mostly chose the Stork (*Ciconia alba*) and Crane (*Grus communis*), to either which he sometimes alludes distinctly, sometimes leaves the reader to guess to which he is referring. He tells us that of the spirits frozen into the ice (Inf. xxxii. 36), that their teeth chatter, and make a noise like Storks; that quaint incessant noise which is so well represented by Hauff’s “Herr Klapperschnabel.” He sketches for us the Stork standing up in its nest after feeding its young (Par. xix. 92), or draws a picture of the little Stork trying to leave its nest (Purg. xxv. 10). Then we have allusions to

their flight, sometimes in a compact mass, sometimes in a long line (Par. xviii. 73)—

“Come augelli surti di riviera,
Quasi congratulando a lor pastura,
Fanno di sì or tonda or lunga schiera”;

or (Purg. xxiv. 64), like the birds that winter on the Nile, sometimes make of themselves a compact array, sometimes fly in a long line. Milton speaks of both in the same passage. He says :—

“Part loosely wing the region, part more wise,
In common ranged in figure wedge their way,
Intelligent of seasons ; and set forth
Their aery caravan, high over seas
Flying, and over lands, with mutual wing
Easing their flight ; so steers the prudent Crane
Her annual voyage.”

So has Dante seen them—seen the great flocks part, and wheel, some north, some south (Purg. xxvi. 43)—seen them, and heard their melancholy note, which is so well adapted to describe the cry of the lost souls (Inf. v. 48)—

“Come i gru van cantando lor lai.”

After the Cranes, Dante has most to say of the Pigeons. He has a wonderfully accurate picture of a flock of them coming down, and setting to work in a business-like way (Purg. ii. 125 : “senza mostrar l'usato orgoglio”), pecking at blades of grass, first on one side and then on another, until a sudden scare comes, and they rise *en masse* and fly away. Or, again, what a perfect picture one has of the Rock-Pigeon sweeping down to its nest with firm expanded wings (Inf. v. 82)—

“Quali colombe dal disio chiamate,
Con l'ali aperte e ferme al dolce nido,
Volan per l'aer dal voler portate.”

So, too (Par. xxv. 19), where a Dove settles by its mate, and walks round it cooing ; the rhythm of the line helps one to imagine the whole scene—

“L'uno e l'altro pande,
Girando e mormorando l'affezione,”

as “les tourterelles roucoulaient” of La Fontaine's fables lets

one hear the Turtles in the tree. Beyond these he notices the Swan (Purg. xix. 46); the Nightingale (Purg. xvii. 20), that delights in its own song; the Blackbird, that sings its song of joy for fair weather (Purg. xiii. 123) ("come fa il merlo per poca bonaccia"); but, above all the common birds, the Lark (Purg. xx. 71)—

"Qual lodoletta, che 'n aere si spazia,
Prima cantando, e poi tace contenta,
Dell' ultimo dolcezza che la sazia."

Of which Landor says: "All the verses that ever were written on the Nightingale are scarcely worth the beautiful triad of this divine poet on the Lark. In the first of them do you not see the twinkling of her wings against the sky? As often as I repeat them my ear is satisfied; my heart, like hers, contented."

In conclusion, I would notice the birds at break of day. As one would imagine, Dante was an early riser, and must have often gone out to wander ere the day had fully dawned. We have already had a picture of early morning with the shepherd. In the "Paradise" (Par. xxiii. 1) he describes the bird sitting on its callow young through the night; then, eager to behold its nestlings, and to get them food,

"Previene il tempo in sul aperta frasca,
E con ardente affetto il sole aspetta,
Fiso guardando, pur che l'alba nasca."

So again (Purg. xviii.), he speaks of the tuneful quire of little birds, who cease not to employ all their skill—

"Ma con piena letizia l'ore prime,
Cantando, riceveano intra le fogli,
Che tenevan bordon alle sue rime."

And of the Swallow (Purg. ix. 14), that near the dawn "comincia i tristi lai." But of all his similes of birds in the early morning, the most perfect is that of the Rooks (Par. xxi. 35):—"And, as following their natural custom, the Rooks gather together at the break of day, move to warm their cold feathers; then some go away without return, others return whence they set out, and others, wheeling round, stay where they are." A perfect picture of a rookery waking up, and one which

must have inspired Shelley in his lines on the Euganean Hills :—

“ I stood and listened to the Pæan
With which the legioned Rooks did hail
The sun’s uprise majestic.
Gathering round with wings all hoar,
Through the dewy mists they soar,
Like grey shades, till the Eastern heaven
Bursts ; and then as clouds of even,
Flecked with fire and azure lie
In the unfathomable sky,
So their plumes of purple grain,
Starred with drops of golden rain,
Gleam above the sunlit woods.”

EARLY ORNITHOLOGISTS.

BY THE REV. H. A. MACPHERSON, M.A.

THE ninth edition of the 'Encyclopædia Britannica,' though now somewhat out of date in scientific matters, contains nevertheless many articles on natural history which can be referred to with advantage. Of the number, Prof. Ray Lankester's article on Zoology is one of the most weighty. But there is a single sentence in this admirable essay to which we have never been able to subscribe, namely, that in which we are informed that "the real dawn of zoology is connected with the name of an Englishman, Wotton" (Encl. Brit. vol. xxiv. p. 803). "The real dawn of zoology" is truly inseparable from the name of an Englishman, but it is the name of William Turner, and not that of honest Wotton which is linked with the foundation of zoological science. Wotton was a book-maker, who made a digest of the zoological knowledge of the classical writers, and published the compendium under the title of *De Differentiis Animalium*. This work was published at Paris, and did not appear until eight years after Turner had published his history of the birds known to Aristotle and Pliny. When it did appear, it failed to add a single new fact to the science which it was supposed to further, for Wotton candidly disclaims any share of original work. He was a compiler, like Goldsmith, and he really deserves no more credit than the author of 'Animated Nature.' The modern science of zoology owes its first conception to the genius of a galaxy of talents, of which Turner, Belon, Gesner, and Aldrovandi were the brightest ornaments, though Rondelet and Salviani accomplished much for ichthyology. If we limit our attention to the science of ornithology, we find that these men knew far more about the anatomy of birds than the majority of twentieth century naturalists. Not only did they observe the habits of wild birds, study their migrations, examine their crops

to ascertain the nature of their food, measure their skins, investigate their changes of plumage, trace their distribution, and describe their eggs, but they paid profound attention to both the muscular system of birds and their osteology. They were nothing if not thorough in their devotion to our beloved science. The attainments of these men were all the more remarkable, because for the most part they enjoyed no advantages of birth. Turner, Belon, and Gesner were all poor men, who fought their way to the front by sheer pluck and indomitable industry. Turner was born beside a Morpeth tannery about 1507; Pierre Belon belonged to some obscure household in the humble hamlet of Soulettière, in Maine, and seems to have been about ten years junior to Turner. Conrad Gesner, a beautiful character, was born and bred in the old town of Zurich. He was born on the 26th of March, 1516. Ursus and Barbara Gesner, his parents, were plain working people. They had a large family to support upon a very meagre pittance. Ulysses Aldrovandi was of noble parentage, but he too had to learn the bitterness of trying to accomplish scientific work with an empty purse. Of dear old Turner we have already spoken at some length, but perhaps the indulgence of the reader will permit a further reference to the father of British zoology. He was a rough, rugged north-countryman—one of those blunt uncompromising men who wish to carry everything their own way, and lack patience for the views of those who differ from them. But if Turner had the misfortune to be a bigoted and determined reformer, he was thoroughly genuine in his professions, and he atoned for all errors of judgment by a life of pain and prolonged exile. His marriage with Mistress Jane Ander increased his difficulties. There is a note of pathos in the reference which is contained in one of his letters to Master Cicell:—"My chylder haue bene fed so long wt hope that they ar very leane, i wold fayne haue the fatter if it were possible."

Pierre Belon's boyhood is a sealed book, but we know that his singular ability and devotion to learning secured for him the notice of kind patrons, who freed him from occasional pecuniary embarrassments, and provided him with a sound education. He was a born traveller, and seems to have been as much at home among the Arabs of the desert as in the society of ambassadors

and courtiers. Wherever he went he made original observations, and his store of information was immense. Conrad Gesner climbed the rungs of the ladder of fame in the teeth of many discouragements. Not only was he one of a large family, but his father fell in the Civil War of 1531; and matters would have fared badly with our hero had it not been that he possessed an excellent relative—John Friccius, his maternal uncle. This benevolent priest was deeply versed in herbal lore, and taught Conrad to study field botany. But the untimely death of his benefactor cast Conrad back upon the mercies of the world, and it was with much difficulty that the stripling became a student at the University of Paris, where he made the acquaintance of John Steiger and other young men, who proved of service to him in later years. It is sometimes taken for granted that Gesner was a mere scribe, who freely utilized the writings of others for his great works, but made few original observations. No less deserved calumny could be heaped upon his memory. Certainly he was a maker of books, but he was not a book-maker in any but the noblest sense. He had as strong a desire to make personal observations as any of us, but it is only the fortunate few who can find leisure and means for research. Gesner visited Italy, and spent a whole month at Venice on purpose to study the fishes of the Venetian lagoons; but, unhappily, war broke out, and compelled him to return home. If he failed to carry out other schemes of travelling, it was not because he lacked enthusiasm, but because his health was poor, and his means were straitened. But though he could not gratify his natural ambition to scour Europe for specimens, he utilized other men to the same end, obtaining both specimens and information from correspondents in many lands. His bright genial nature won for Gesner the loyal support of all who had the privilege of knowing him. Aldrovandi, in his old age, wrote rather slightly of Gesner, because he had arranged his history of birds alphabetically, as Prof. Newton has done in our own day. But we know that Gesner, like the modern naturalist whom he so closely resembled in his great erudition, adopted an alphabetical arrangement solely for the convenience of his readers. He was every bit as anxious to further the interests of taxonomy as his gouty critic, but there is a time and place for everything. Aldrovandi himself was

perhaps the finest zoological genius that Italy has produced. That may seem a strong thing to say, for Italian ornithologists are men of high culture; Aldrovandi was at least the first of the race of ornithologists who have conferred so much honour on Italy. He was nobly born, but was only five years old when a fever carried off his father in his thirty-fourth year. The education of the family thus became the care of the young widow Veronica, who showed a wise discretion in the management of her fatherless children. Ulysses was the flower of her little flock, for he possessed "*un vivacissimo talento, ed un particolar genio agli studi, corrispose mirabilmente alla brama ed attenzione materna.*" He was at first intended to follow mercantile pursuits, but his natural bent asserted itself, and eventually he obtained the professorship of natural history in the University of Bologna.

Having thus referred in brief to the youthful vicissitudes and later triumphs of the four great naturalists of the Renaissance, it is right that we should attempt to supply a slight sketch of what they did for ornithology.

Turner wrote as early as 1544, and he supplied a trustworthy account of the species of birds which he knew to be found in or to be absent from England. He added many details of their habits, and recorded their provincial names. He also aided his zoological brethren on the Continent, especially Gesner, who warmly and impulsively records the great assistance he had received from the most accomplished English naturalist of the day. Pierre Belon was shown a specimen of the Siskin which had been sent to his friend Antoine Martinell by "M. Turnerus medecin Angloys." Turner was a scholar of no mean ability, and his active mind was always pondering over Aristotle. When his boat was becalmed off the Dutch coast, he consoled himself for enforced delay by an endeavour to decide whether the "white semau wuith a black cop" that hovered round the little craft was the "Cepphus" of his favourite author. Turner had a sadly chequered career, and died a disappointed man; but his widow made a good second marriage. If the suffering which lined his brow with furrows and abridged his life was bred of his fiery intolerance of the views of others, at any rate he was a martyr to his convictions, and should be held in the highest

honour and esteem by every successive generation of British naturalists.

A very different man from the Northumbrian controversialist was the father of Gallic zoology. Pierre Belon was the favourite of prelates, welcomed by foreign ambassadors, and flattered by courtly parasites. But he was not spoilt by mature prosperity any more than by his early adversity. A lively, quick-witted Frenchman, with a passionate love of birds, he had obtained a good knowledge of the birds of his beloved France before he commenced those travels which have rendered his name so famous. Aldrovandi says that his French was very bad, but good Ulysses must have his little hit at all possible rivals. Probably he was right in this particular, for the prose of Belon's 'Oyseaux' is difficult reading; but it is one of the few books which we can always take up with fresh pleasure. Belon has the knack of making you feel that he is talking to you about the birds he has just seen; the Vultures that soar around the volcanic hills of Auvergne; the Wall-Creepers that zigzag about the precipices; the Ptarmigan that frequent the high Alps; and many other fowls of divers orders. His prose is full of chit-chat. At one moment he describes the anatomy of some uncommon bird; at the next he is telling you how to cook a Hoopoe, or something equally irrelevant to the theme upon which he was gravely discoursing an instant ago. He was interested by two species of birds which he found in England; for of course he visited England, like Clusius and other contemporary naturalists. The first species, which was new to Belon, was the Norfolk Plover; the other was the Cornish Chough. When he recrossed the Channel he searched for Norfolk Plover, and found that this species was common to France as well as Britain. The migration of birds constantly occupied his thoughts. He was much impressed by the sight of Quail migrating across the Mediterranean. His remarks upon the migratory habits of Pelicans are very interesting; but, indeed, he was a delightful *raconteur*, and could entertain you with some pleasant reminiscence of almost every European bird. His untimely death by the hand of an assassin in the Bois de Boulogne, at Paris, was one of the saddest events of the sixteenth century. Our French *confrères* have reason to be proud of Pierre Belon, of Le Mans.

Conrad Gesner fully shared Belon's love of wild birds. He was a student of the anatomy of birds—as much so as Belon, and more perhaps than Aldrovandi, because Aldrovandi generally persuaded a professional anatomist to act as his prosector. But Conrad was also a good field-observer, with eyes and ears trained to detect the passage of migrating flocks. He took a great interest in the rarer birds of the Swiss cantons. He was cognizant of two or three breeding stations of the Black Stork, one of which was in the neighbourhood of Lucerne.

Gesner was well informed regarding the habits of the Black Stork, which he describes as nesting in trees, usually pine-trees. He dissected one of these birds which had been procured near Zurich. It had been feeding upon beetles and other insects. He remarks that this Stork had a fishy smell; such a bird should first be boiled, and then stuffed with herbs. The flesh was good and sweet, but the skin proved tough. Very pleasant reading is afforded by Gesner's account of the Bustard. The Great Bustard was not a common bird in Switzerland in the sixteenth century. Nevertheless, several of the birds which Gesner examined had been killed near Zurich, or near Coire, in the Tyrol. Conrad had the curiosity to weigh a couple of Bustards. One of these birds scaled nine pounds twelve ounces; the other turned the scales at thirteen pounds and a half. The stomachs of these birds were filled with vetches, but Bustards which had been killed in heavy snow contained pebbles and the bark of trees. Conrad Gesner was told that Bustards were “permultos in Anglia,” but whether he owed this piece of information to John Falconer, Thomas Gybson, John Estwyck, to Turner, or Dr. Caius, has not apparently been solved. Gesner corresponded with all five of these British naturalists.

Gesner examined many other birds of local interest—such, for example, as a Spoonbill killed near Zurich in the month of September. The early nesting proclivities of the Crossbill were as well known to this great Swiss as its variations of plumage. He studied the seasonal changes of the Ptarmigan. Friends at a distance often sent birds to be described by Gesner—*e.g.* the Stilt, the Purple Waterhen, the Pin-tailed Sand-Grouse. The most remarkable perhaps of all his discoveries was that the rare Bald-headed Ibis, now lost to Europe, nested on the lofty walls

of ruined castles in Switzerland. He carefully details the breeding stations, including one situated on the promontory of Pola, on the Adriatic, explaining how a man was lowered over the edge of the precipice with a rope, in order to take the young birds, which were esteemed great delicacies by epicures. He supplies precise particulars of the life-history of this little-known Ibis, and furnishes its provincial names. Young Ibises were taken from their nests before they could fly, in order that they might become tame and attractive pets. A dead Ibis, which Gesner had an opportunity of dissecting, proved to have been feeding upon certain insects that affect the roots of standing corn. Notwithstanding the heavy strain of his general literary labours, Gesner sustained his lively interest in ornithology to the close of his life. He tells us that "in the past year we first heard Cranes migrating on the 11th of September, one hour before nightfall; but in the year 1561 we heard Cranes passing through the air at four in the afternoon, and at nine at night, on the 17th of October, the weather being very mild."

It was the introduction of the plague into Europe which brought a great public sorrow to the Zurichers in the year 1565. The fatal carbuncle appeared on the left side of the victim, near the heart. It was in a dangerous position, but was not accompanied by fever. As many of those who were attacked by this terrible malady had already succumbed to its ravages, Gesner took leave of his acquaintances, confided his personal wishes to his most intimate friend, Henry Bullinger, and prepared for the worst. His chief anxiety was to give as little trouble as possible. "*Sic qui in vita multis commodus, molestus fuit nemini.*" About eleven at night, when he felt that the end was near, he summoned his wife, and expressed a wish to be carried into his museum. His desire was gratified, and a little later he gently passed away—"atque paulo post illic in manibus uxoris, inter pias preces, leniter die decima tertia Decembris exspiravit."

Aldrovandi was a man of active habits, fond of field-work, and a careful observer. He was also the centre of a large circle of friends, who admired his enormous learning, and delighted to present him with rare or unexpected specimens. It is charming to read of the gifts which poured in on him—now a beautiful Greenland Falcon, which had died at Rome, and was considered

a great rarity; then a nest of young Golden Orioles; now a Bohemian Waxwing; and again a fine male of the Great Bustard. The donation of the latter bird was a great joy to the old naturalist. He induced his friend Auranti to dissect the bird, and figured the gular pouch, "*qua se in vastam capacitatem insinuat,*" thus anticipating the labours of John Hunter and other more recent anatomists. The truth is that Aldrovandi often anticipated the so-called discoveries of his successors. Gmelin takes the credit of having discovered the White-collared Flycatcher in 1788, but it was figured and described by Aldrovandi. In the same way the elder Brehm enjoys the honour of having discovered the Firecrest in 1820, though Di Valli figured the species in 1601; while Olina not only figured it again in 1622, but described it—"sopra l'occhio ha una machietta bianca." Aldrovandi figured the black-chinned variety of the Brambling, though it was described as novel by the late Mr. Dawson Rowley. There are many things we might learn from the naturalists of the Renaissance. Read the account which Aldrovandi gives of his visiting a colony of Egrets and other aquatic birds in the Italian marshes, and then compare it with the late Mr. Seebohm's description of the same birds nesting on the Danube. The two accounts are identical in purpose, and not very dissimilar in style. Aldrovandi was the only one of the four great naturalists of his century who lived to a great age. Belon was cut off at forty-five, Gesner died at forty-eight, Turner had apparently reached sixty-one when he ceased from 'The Huntynge of the Romishe Wolfe.' Aldrovandi long survived all his rivals, and finally passed away in his eighty-fifth year, poor in substance, but rich in the esteem of his fellow-countrymen, who gave his mortal remains a magnificent public funeral. He had spent all his money in the preparation of his great works, and had been compelled to accept the favours of opulent patrons; but he had performed a noble service to zoology. His name will never be erased from the list of those who helped to feed the flame of scientific research during the stormy and eventful years which followed the birth of the New Learning in Europe.

BREEDING HABITS OF THE SWIFT.

By THE REV. ALLAN ELLISON.

I HAVE been much interested by the Rev. F. C. R. Jourdain's article on this subject (*ante*, p. 286), and especially by the evidence he brings forward upon the question as to the number of eggs produced at a laying by these birds. How there ever has been a controversy on this point is a puzzle to me, unless it be that comparatively few observers have examined any great number of the nests of the Swift, owing to the difficulty of getting at the places where they build.

In days gone by I had unusual facilities for investigating the breeding habits of the Swift, as a large colony nested in crevices under the eaves of some tall buildings to which I had free access. I examined some dozens of their nests, and found three eggs to be quite a usual number—I should say, more usual than two. The experience of Mr. R. J. Ussher ('Birds of Ireland,' p. 103) agrees with this. The suggestion that when three eggs are found, they are the produce of more than one female, is, I think, untenable. Far more probably, in many cases where but two are found, one of the eggs has been destroyed, or dropped away from home. Mr. Jourdain has mentioned that broken eggs have frequently been found under the nesting-places, showing that eggs sometimes roll out of the nests. This is a thing very likely to occur, as the nest of the Swift is generally a very slight affair—saucer-shaped or almost flat. I have once found the eggs resting on the bare stone, with only a slight ring of nesting materials round them. In the case of almost any bird's nest, it is not unusual for one or more of the eggs belonging to the clutch to be missing. Thus I have found the nest of a Long-eared Owl with but one egg, nearly ready to hatch, though that bird lays five or six eggs. The explanation was soon found, however, for in the same wood there was the nest of a pair of Hooded Crows with the bird hatching.

The well-known fact that Sparrows often quarrel with the

Swifts over the possession of the nesting-holes will account for many an egg being knocked out of the nests. I have also noticed that the Swifts themselves, when disturbed, have a habit of fluttering and scrambling about in their nesting-holes, so that eggs may sometimes be dislodged by the parent birds.

The question also occurs—Are birds which nest in deep holes or crevices known to lay in each other's nests? This takes place most usually in the case of birds which make open nests on the ground, especially those which breed in colonies, as Gulls or Terns; also in the case of Game-Birds, as Partridges or Pheasants; and Water-Birds of various species, as Ducks, Coots, Moor-hens, &c. It certainly occurs less frequently with those which build their nests in trees or bushes, as do most Passerine birds; and, I should say, very rarely, if at all, in the case of birds which nest in holes. This, however, is a subject upon which further investigation is desirable.

The nesting materials which Mr. Jourdain mentions as used by the Swift agree entirely with my own experience. Feathers, small straws, and pieces of rubbish are always found—just such materials as would be blown into the air on windy days; but I have also generally found a quantity of the blossoms, catkins, or bud-scales of various trees, especially those of the oak and beech, which are blossoming just at the time when the Swifts are building, and whose blossoms are frequently blown about by the strong breezes of the end of May. These materials are always cemented together by a glutinous substance secreted by the bird. Indeed, without this curious provision of nature, the scanty materials could hardly be woven together into a nest at all; and it is no doubt intended to keep the substance of the nest from being dispersed, as the Swift generally builds in a large and irregular crevice, and is not able to lay down a large bed of materials filling the entire bottom of the hole, after the manner of the Tits or the Creeper; nor, as in the case of the Sand-Martin, would the loose feathers and straws be held together by being placed in a small and comfortable space.

There is no doubt a good deal yet to be learned about the nesting habits of these interesting birds, for the difficulty of observing them is very great, owing to their breeding in dark holes and crevices out of sight, and often in rather inaccessible situations.

OBITUARY.

WILLIAM DOHERTY.

WILLIAM DOHERTY, the well-known zoological collector and traveller, died at Nairobi, East Africa, on May 25th. He was of Irish descent, born, I believe, at Mount Auburn, Cincinnati, U.S.A., where his parents now reside. He appears to have first gained notoriety as a collector in India about 1886, and made several expeditions on behalf of the authorities of the Calcutta Museum.

In 1888 he travelled through South-east Borneo, and the results of this journey were the first collections he sent to England. The following year he visited the more unexplored parts of South Assam, Manipur, and the Ruby Mines district of Burma, sending to this country extensive collections from these localities; thence he worked down through the Malay Peninsula, and on to Sumatra, returning to Calcutta in 1891.

Early in 1892 he started on a more extended expedition through the Malay Archipelago, visiting Alor, Solor, Sumba, Adonara, Buru, Amboyna, Sumbawa, Timor, Batchian, Sanguir, Talaut (where he discovered a remarkable black species of the genus *Ornithoptera*, named after him), Ternate, Wetter, Gilolo, Tenimber, and other islands, forming most extensive and valuable collections. He finally proceeded to Humboldt Bay, New Guinea; and, although this was a most unhealthy place, and he and his trained collectors were constantly suffering from attacks of fever, the richness of the fauna, and the many new discoveries he was making, induced him to prolong his stay, until they were all attacked with "berri-berri," to which they nearly succumbed. Leaving there towards the end of 1893, he found it necessary to return to his home in Cincinnati, where the state of his health compelled him to remain inactive for nearly two years.

In November, 1895, he was in London, on his way again to the East to explore some of the islands he had not before visited.

On this journey he finally proceeded to Manilla, at the commencement of hostilities between the Governments of the United States and Spain; and afterwards, when in London, related to the writer how, while apparently collecting objects of natural history there, he prepared plans of the harbour and defences, making tracings of them upon articles of clothing, which he succeeded in bringing out with him, and delivering to Admiral Dewey at Hong-Kong, and which he asserted enabled the American fleet to so easily enter and capture the place.

After this he returned to America, but early last year was again in London, arranging an expedition to East Africa and Madagascar; and, although evidently in very bad health, he left in March for Mombasa. From here he worked along the line of the Uganda Railway into the interior, making valuable collections in the neighbourhood of Lake Naivasha and other parts. In the last consignment received from him were a fine series of the remarkable, and hitherto unique, *Papilio rex*, and also the *Danais formosa*, of which it is so extraordinary a mimic. Doherty was probably the most successful and extensive collector of birds and insects since the days of Bates and Wallace.

He wrote some papers on the butterflies of some of the localities he visited, which have been published in the 'Journal' of the Asiatic Society of Bengal. He also paid much attention to land-shells, and discovered many new species.

His age is not known to the writer, but was probably about forty-five.

O. E. J.

NOTES AND QUERIES.

MAMMALIA.

Pigmy Shrew in Yorkshire.—Those interested in the distribution of the Pigmy Shrew (*Sorex minutus*) may be glad to learn that I trapped four examples at Kilnsea, near Spurn Point, in Yorkshire, last August. It was apparently quite as abundant there as the “Common Shrew,” and, curiously enough, commoner than *Mus sylvaticus*, which, owing perhaps to the prevalence of Stoats and Weasels, was unusually scarce.—R. I. Pocock (Brit. Museum, Nat. Hist.).

Stoat and Weasel Trapping.—It may interest some readers of ‘The Zoologist’ to know that Stoats and Weasels can be trapped without difficulty with large Schuylers. This, at least, was my experience at Kilnsea, near Spurn Point, in Yorkshire, this August. The first Stoat caught in this way was taken in a trap baited with bread, and set for Water-Rats. It was snapped across the middle of the neck, but was strong enough to pull the trap into the water, where I found it in the morning drowned. I was inclined to suppose at the time that this catch was due to the lucky chance of the Stoat running into the trap, and accidentally setting it off, when hunting along the Water-Rat runs; but the position of his head with regard to the bait suggested an attempt at tasting it. Hence I resolved to try again, and, baiting this time with the skinned carcase of a Bank-Vole, set in a dyke, at the mouth of a hole supposed by a farmer’s lad to harbour a Weasel. Two days afterwards I found a fine Stoat lying dead, killed on the spot by the fracture of the parietal bone of the skull, and with the bait, in spite of its unsavoury odour, clenched fast between its teeth. I afterwards caught a Weasel in the same way, the trap being baited with Bank-Vole unskinned. The Weasel was caught well behind the skull, but was apparently killed without a struggle.—R. I. Pocock (Brit. Museum, Nat. Hist.).

AVES.

Chiffchaff Singing in Autumn.—While dressing on the mornings of Sept. 28th and 29th, I distinctly heard a Chiffchaff (*Phylloscopus rufus*) singing, my bedroom window being open at the time. As I was rather

sceptical about it, I went out afterwards into the garden, and saw the bird busily feeding among the leaves of a sycamore. I watched it for about a quarter of an hour, and during that short time it sang thrice—not faint-heartedly, but in good voice. I heard it several times afterwards up till one o'clock, when the song ceased altogether. The weather was remarkably warm, and the sun very bright.—A. H. MEIKLEJOHN (Ashford, Kent).

Breeding of the Blue-headed Wagtail in Sussex.—A nest of the Blue-headed Wagtail, containing four eggs, was found in a turnip-field near Winchelsea on May 31st, 1901, by Mr. George Bristow, Jun. Three of the eggs were accidentally broken, but the remaining egg (unblown), together with the nest and the parents, have been examined by Mr. H. E. Dresser, Mr. Thomas Parkin, and the present writer. Mr. Dresser kindly writes that the birds “come nearest to *Motacilla beema*, Sykes [Proc. Zool. Soc. Lond. 1832, p. 90; cf. Sharpe, Cat. Birds, Brit. Mus. x. p. 521, pl. vi. fig. 6 (head only)], which species, or rather subspecies, differs from *M. flava* in having the cheeks white, with only a broad blue streak through the eye. . . . Sharpe gives the range as Eastern Siberia, India, &c.; but it has been obtained several times in Southern Europe.”—W. RUSKIN BUTTERFIELD (4, Stanhope Place, St. Leonards-on-Sea).

***Ægialitis hiaticula* nesting in Middlesex (within London Postal District).**—Last May (1901). I was surprised to find, on the sewage farm here—which is within the London postal district—Redshanks, Dunlins, and Ringed Plovers, the last named in considerable numbers. From the behaviour of one pair of Ringed Plovers, I was convinced that they had nested, but feared that the eggs had been destroyed by a harrow at work in the field. As I was on the point of starting for Holland, I asked the superintendent, who is a good and observant naturalist, to keep his eye on them while I was away. He now tells me (Aug. 27th) that during my absence he saw three young Ringed Plovers freshly hatched, and actually caught one of them and handled it. This seems to be proof of an extremely interesting event. There is no doubt that Snipe breed in the same place. A Snipe was bleating overhead daily during May, but, though I searched carefully for many hours (wading knee-deep in liquid sewage), the vegetation was so excessively thick and rank, that I was unable to find the nest. I had to-day (Aug. 27th) the pleasure of watching a Snipe on the ground for some minutes through a glass, and in the previous week a brace of Teal were shot (young birds). There are now numbers of Yellow Wagtails about (this Wagtail nests here regularly), and large flocks of

Starlings and Greenfinches, the latter feeding on the pinkish seeds of *persicaria*. A small lot of Ringed Plovers are still about, some of them apparently birds of the year, and a few Green Sandpipers, and Redshanks. I was very close to three of these last birds for some time this afternoon.—R. B. LODGE (Enfield).

Broad-billed Sandpiper in Kent.—An immature female of the Broad-billed Sandpiper (*Limicola platyrhyncha*) was procured on Aug. 31st last near Littlestone-on-Sea, Kent. The specimen has been preserved by Mr. G. Bristow, of St. Leonards. This is the second Kentish example of this species that I have examined in the flesh. The first, also an immature female, was obtained at the same place on Sept. 6th, 1896, and was recorded by Mr. Boyd Alexander (Zool. 1896, p. 411).—L. A. CURTIS EDWARDS (31, Magdalen Road, St. Leonard's-on-Sea).

Occurrence of the Broad-billed Sandpiper in Sussex.—An immature male of *Limicola platyrhyncha* was shot on the shore near Bexhill by my friend Mr. A. C. Wendell Price, on Sept. 14th last, Early in the morning of that day he fired a "right and left" at a party of three birds (the only waders observed during the morning) flying strongly westward, and killed the specimen in question, together with a Dunlin. On viewing these birds the next day, I had the pleasure of identifying the Sandpiper, which is very similar to the recent Kentish specimen recorded by Mr. Edwards, *supra*.—W. RUSKIN BUTTERFIELD (4, Stanhope Place, St. Leonards-on-Sea).

Wood-Sandpiper in Co. Dublin.—On Aug. 19th I flushed and obtained a Wood-Sandpiper (*Totanus glareola*), in immature plumage, near Sutton, Co. Dublin. This, I believe, is the first occurrence of this bird in Co. Dublin, three having been shot at various times in the adjoining county of Wicklow, and one in Co. Waterford, this specimen being the sixth recorded from Ireland.—W. J. WILLIAMS (19, Garville Road, Dublin).

Sandwich Tern on the Norfolk Coast.—An adult male Sandwich Tern (*Sterna cantiaca*) was shot by my son on Sept. 14th from a rowing-boat within half a mile of Hunstanton Pier. Mr. Clarke, of Snettisham, who set it up for us, told me that only one or two others had passed through his hands. I have seen several other Sandwich Terns about, probably passing along the Wash on migration from their breeding-places on the Scotch and Northumbrian coasts. It is quite possible (*vide* Zool. 1894, pp. 88, 89) that this species does occasionally breed on the Norfolk shore.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

Ornithological Notes from Shetland.—I have much pleasure in recording the fact that a pair of Chaffinches (*Fringilla cœlebs*) nested this summer in the shrubbery adjoining my house, and brought out two young ones, which were able to fly on Aug. 24th. The whole family came daily to be fed along with the fowls, and are very tame. A number of Redstarts (*Ruticilla phœnicurus*) made their appearance on Sept. 5th. This is somewhat earlier than usual; they generally arrive here in October. On May 11th, 12th, and 13th a Nightjar (*Caprimulgus europæus*) was seen by me and by others at Baltasound. The Great Skua (*Stercorarius catarrhactes*) has increased in numbers greatly during the past few years, there being at least eighty-four birds on this island. It is a pity that something cannot be done to prevent the wholesale destruction of that magnificent bird, the Great Black-backed Gull (*Larus marinus*), which is becoming rare here. I cannot ascertain that it ever does much harm, yet our County Council has declared it to be "vermin," and has employed men to destroy it.

Since writing the above I have been fortunate enough to have brought to me another rare bird, *viz.* the Great Spotted Woodpecker (*Dendrocopos major*). The bird—a young male—was caught by a native in a stubble-field close to his house, situate in the most northern part of this island. It was in a most dilapidated and starving condition. The weather for many days previous to its capture on Sept. 9th had been very wet and stormy, with heavy gales from the east and south-east. Though instances of the occurrence of the Great Spotted Woodpecker have been recorded from Shetland, I have never been fortunate enough to come across one till now. A female Spotted Crake (*Porzana maruetta*) has been brought to me; it was caught close by Cliff Lock, near here. This is, I think, the fourth time this bird has been recorded from Shetland.—T. EDMONDSTON SAXBY (Halligarth, Baltasound, Unst, Shetland).

REPTILIA.

The Sloughing of Serpents.—In continuation of Dr. Leighton's communication of my notes upon the sloughing of an Indian Python (*ante*, p. 301), it may be of interest to bring them up to date, as follows:—

January 14th, 1901.—Python showed usual signs of sloughing upon this date, and entered his bath upon the following day, remaining there until the 19th, when he left the water. Re-entered again the same day, and remained until the following day, when he shed the slough in the water in many small pieces.

April 1st.—Python entered his bath, and remained until the 12th, when he cast the slough in the water in two pieces.

June 13th.—Python entered bath upon this date, and remained continuously in the water until the 28th, when he shed the slough in the water. It was in two pieces, with many rents in it.

This Python has therefore shed sixteen sloughs in four years.

A small Boa Constrictor, six feet in length, which I obtained on July 3rd, 1901, entered his bath upon the 8th, and remained there continuously, but not always completely submerged, until the 14th, when it left the water, but did not shed the slough until the 16th. The actual operation of shedding occupied only twenty minutes. The slough was in one piece, and almost perfect. This Boa entered its bath again on Aug. 15th, without showing any signs of sloughing, and remained there continuously until Aug. 26th, when it left the water, having exhibited the first signs of sloughing upon Aug. 20th. The slough was cast, quite perfect and all in one piece, upon Sept. 1st.

Upon July 18th I purchased two young Boa Constrictors which had been born in captivity on July 10th, 1901. They were each about fourteen inches long. They both showed signs of sloughing when they arrived, and spent most of their time curled up in the water-tank. One of them left the water on July 27th, and cast its skin immediately after. The slough was in one piece and quite perfect, but the head was torn off. The other young Boa shed its slough on July 31st, also in one piece, but minus the head. It left the water three days previously. The one which cast its slough first constricted and swallowed a young mouse on Aug. 27th—its first meal. The other has not fed up to the time of writing (Sept. 2nd). Both of them are now about eighteen inches long, and much more lively and active than the larger snakes.—W. J. CLARKE (44, Huntriss Row, Scarborough).

The Sand-Lizard in Berkshire.—I notice (*ante*, p. 355) that the Sand-Lizard (*Lacerta agilis*) is spoken of as being restricted in Britain to the southern half of England. Is it known to occur in Berkshire? The country people here have assured me of the occurrence of large Lizards (presumably Sand-Lizards) in the neighbourhood, but I have never met with any individuals myself, though the locality appears to be fairly suitable for them. I fear there is little dependence to be placed on what is said by ordinary country people in natural history matters. Here the great Green Grasshopper and the larva of the Death's-head Hawk-moth are both known as "Locusts," and a Lizard of large size, said to have been captured in a neighbouring parish some ten years ago, was pronounced by a villager to be a Viper. If

any contributor to 'The Zoologist' could inform me of localities in Berkshire in which the Sand-Lizard occurs, I should be obliged.—W. H. WARNER (Fyfield, near Abingdon, Berks).

ARACHNIDA.

The Distribution of the Diadem Spider.—It is generally taken for granted, I believe, that *Aranea diadema*, Linn., the so-called Common Garden Spider, is uniformly distributed throughout this country. A collecting experience of some years' duration in various counties in the South of England had impressed this idea upon my mind, and the material that has passed through Mr. O. P. Cambridge's hands prompted his statement that this Spider "is found in all parts of Great Britain and Ireland." I was therefore surprised to find no trace of it at Kilnsea, a small village near the extremity of the promontory that ends with Spurn Point, in Yorkshire, where I collected in the latter half of August—a time when this Spider is in full force in the localities it frequents. That the physical features of Spurn Point contain no element likely to be inimical to the welfare of a species so adaptive in its habits as *diadema* is attested by the presence of such allied forms as *A. quadrata*, *A. cornuta*, &c., which were met with in some abundance; nor, so far as could be ascertained, had there been any exceptional climatic occurrences during the previous spring and winter to account for its local extermination for the time being. The object of this note is to draw attention to the probability that we have yet something to learn on the negative side respecting the distribution of this well-known species, and to induce those who have the opportunity of investigating the point to ascertain its range in the East Riding of Yorkshire, and other parts of the east of England, especially in places where the soil consists of boulder clay.—R. I. Pocock (Brit. Museum, Nat. Hist.).

NOTICES OF NEW BOOKS.

Bird Watching. By EDMUND SELOUS. J. M. Dent & Co.

READERS of 'The Zoologist' require no introduction to Mr. Selous. He practically inaugurated a new method of field observation by his "Observational Diary of the Habits of Nightjars," &c., in our volume for 1899. This paper is not included in the volume under notice, but it contains a wealth of information relating to other birds which is in the truest sense original. The time is now fast approaching when ornithological field work—in this country—will no longer be conducted only with the gun. We have abundantly seen what the camera will do; Mr. Selous has now told us how to work with the field-glass. We shall give no extracts from this book, which demands the perusal of ornithologists; but we shall consider its main thesis, for, apart from observations, it is a book with a motive. That motive is the sanctity of bird-life—applicable, of course, to other living creatures.

To Mr. Selous our "zoologists" have been "*thanatologists*." "Had we as often stalked animals in order to observe them, as we have in order to kill them, how much richer might be our knowledge!" We believe this to be unanswerable, and the writer of this notice must admit that many of the very happiest days of his life passed in procuring specimens are now regarded with very grave suspicion. But we must not exaggerate this emotion. If it is unnecessary to kill for study—and we do not say that in very many cases it is not—it is equally true that it must be wrong to kill for sport,* and by sport the fish must be equally regarded as the bird. The table, as well as the museum, is the culprit. We really enjoyed that piece of Salmon, though it was not necessary to our existence; the unfortunate Lobster

* The newspapers have recently recorded that the Mackintosh of Mackintosh has broken the record for a day's Grouse-driving in Scotland, he and his friends having killed more than nine hundred brace in Inverness-shire.

created no reminiscence of his awful death when we ate it at a late breakfast; and we are still sufficiently unregenerate to hope that those who have the accident in opportunity to shoot will remember us in the autumn. But this does not invalidate the argument of Mr. Selous, and let us remember that the evolution of ethics has been very slow, and is still going on; while that we have moral obligations to other animals than ourselves is a fact only dawning as a revelation. The prophet and reformer must be always in advance of their times, and possibly this is a mark of their true vocation.

Manual of the Birds of Iceland. By HENRY H. SLATER, M.A., F.Z.S., &c., Rector of Thornhaugh, Northants. David Douglas.

MR. SLATER has made good use of his visits to *Ultima Thule* by collecting the material for this Manual. He prefaces his small volume with some valuable hints as to the pronunciation of Icelandic names, and remarks that "many of us seem to consider ourselves entitled to be a law unto ourselves in the manner of the pronunciation and spelling of foreign names and words." A remonstrance on this point will probably always apply, but even some may ask with reference to English words why Mr. Slater spells the name of the Duck generally known as "Shoveler" with a double l? The "Bibliography" is a specially welcome feature, and some of the books are recommended "as likely to be useful." We are quite sure that Mr. Slater's book now under notice supplies a want, and will be more than useful; but all books must be studied by and for themselves. Many an out-of-the-way record is frequently found, and found only, in a decidedly bad book.

Those who take an interest in the advancing science of folklore will find a subject of much interest in Mr. Slater's account of the Cuckoo, "which has never been known to occur in Iceland; and yet few Icelanders will be ignorant (they almost universally have a literary turn) of the Icelandic name of the Cuckoo—*Gaukr*, which is Eddaic, and yet, though the bird is non-existent in Iceland, well known to-day." One of the most entertaining narratives is that connected with the Northern

Wren (*Troglodytes borealis*) ; but we must here have a parting grumble, for when Mr. Slater remarks of a specimen which slipped down a crevasse, and "appeared to go straight down to New Zealand, or somewhere even warmer," he is infringing on our privileges. These jokes cannot be used by the Rector, but belong undeniably to we of the laity. This is one of those little books that will eventually be found on most shelves, and be frequently consulted.

The Life-History of British Serpents, and their Local Distribution in the British Isles. By GERALD R. LEIGHTON, M.D.
William Blackwood & Sons.

SOME of the contents of this volume have already been published in these pages, and the book is devoted to our three British snakes—*Tropidonotus natrix*, the Ring-Snake ; *Coronella austriaca*, the Smooth Snake ; and *Vipera berus*, the Adder. Dr. Leighton has diligently collected all the available information procurable by him relating to these reptiles, and has thus produced an excellent contribution to a complete knowledge of the subject. A very large part of the book is devoted to the Adder, and much useful information is given as to its variation in colouration, which does not appear to be of a local or environmental character. Then we come to that ever recurrent question—does the female Adder swallow her young ? Dr. Leighton has, in stating the case for both sides, evidently incurred misrepresentation as an advocate for the swallowing theory ; but this cannot be maintained. He certainly does not deny it, but holds the agnostic position, which is one that is generally misunderstood on any subject. However, a reward has been offered for any single authenticated record of this much reported occurrence, and that reward has never yet been claimed. The position of "doubting Thomas" is therefore a very wise one on this question.

The section relating to the distribution of these three species in Britain is a piece of good work, well done, and an appendix affords the reader an excellent opportunity to fill in his own observational log-book respecting the three species. The illustrations are ample, and a portrait of that sylvan celebrity who rejoices in the appellation of "Brusher Mills" is also given.

EDITORIAL GLEANINGS.

THE British South Africa Company have issued a volume of Reports on the Administration of Rhodesia, 1898-1900, which contains a wealth of information respecting the development of this large area. We can only refer to 'Notes on the Fauna of North-eastern Rhodesia,' written by Mr. C. P. Chesnaye, Secretary to the Administration of North-eastern Rhodesia, and confine ourselves to the report on the Mammalia.

The district lying to the west of the Loangwa and the swamps of Bangweolo and Mweru form a natural home for the larger Mammalia and Reptilia. The Elephant is still to be found in large herds in these districts, its haunts being protected from the hunter owing to the feeding-grounds for a greater part of the year being in almost inaccessible swamps. The formation of a game-reserve in the country lying east of the Mweru Lake, which has been effected by the Administration, will assist in a great measure to preserve these animals. South of the Tanganyika Plateau there are several Swahili traders who continually hunt the Elephant, and there is no doubt that in a few years the Elephants in that district will gradually retire into the reserve, where they can live and breed without fear of molestation. The Rhinoceros is found in several districts, but more or less localized in bushy country. They have been met with on the Loangwa and Chambezi Rivers, and are numerous in the waterless country between M'kupa's village and Kaulungombie on Lake Mweru. The horns of this animal, as an article of export, are not of much intrinsic value, but the hide is valuable cut into strips. The Hippopotamus inhabits all swamps and rivers, and is also found in the sheltered bays of Lake Tanganyika, where these animals are constantly seen in herds of from twenty to thirty. The export of Hippo hide appears to be increasing, as a good price can now be obtained for it in the South African market. As far as can be ascertained, it appears there is a solitary herd of Giraffe roaming about the Loangwa Valley, consisting of from twenty to thirty head. These interesting animals have been seen by traders, and are stated to resemble the Somaliland species rather than that found south of the Zambesi. Owing to the effects of the "Sokoto,"

more commonly known as the rinderpest, which came down the east side of Tanganyika, and swept over this country in 1893, game, especially the Buffalo, Eland, and Lechwe, is scarce in some districts. To judge from the melancholy sight of bleaching bones still evident in the sandy portions of the Mweru district, where grass grows very sparsely, game must formerly have been both abundant and of great variety. Nevertheless, the country is gradually recovering itself, and most districts are now very rich in game of all kinds. A few small herds of Buffalo are still to be met with in the country near Lake Mweru. Roan Antelope, Eland, Hartbeeste (Lichenstein's), and Zebra are plentiful all over the country, especially about the south of the Tanganyika Plateau. Immense herds of Mpala are met with on the east and west of the Luapula River. Pookoo and Lechwe are numerous in the Mweru district, and a few small herds of Pookoo have been seen in the Loangwa Valley. Sable Antelope are not frequently met with, but have been seen in the Mweru district. Around the north of Mweru Lake, and especially on Kilwa Island, Sititunga are numerous, and some very fine specimens have been obtained by hunters. Sassaby (Tsessebe) have been seen west of Lake Bangweolo, but there is no evidence of their being found in any other district. Many smaller species of Buck are well represented. The Wart-hog and Bush-pig are common in any part of the country. The natives, in their language, compare them to a plague similar to Locusts, owing to the havoc these animals do in their gardens.

Carnivora.—Amongst the Carnivora, Lions are to be found in most districts, but, owing to the vast quantities of game, rarely visit settlements. Leopards are also plentiful, and frequent mostly hilly country, but are rarely seen. The Chita (Cheetah), though rare, is found sometimes; two specimens have been obtained in the Tanganyika Plateau lately. The Hyena, both striped and spotted species, are found here; also Jackals of various kinds. Civet and Serval Cats abound in the thickets, and are often trapped by the natives, who make bags and pouches out of their skins. It is stated that the Serval Cat can be easily tamed, and becomes quite domesticated. On the banks of the rivers and lakes two kinds of Mongoose are found, which render a veritable service to mankind by their active destruction of Crocodile eggs, for which they have the greatest fondness.

Quadrumana.—In bushy country the Quadrumana excel all other animals in number and variety. The Chimpanzee inhabits the virgin forests of the Malungi country, the Black Ape is found west of Chivalis, and Grey Monkeys are common everywhere.

LIEUT. BOYD ALEXANDER has contributed to the 'Daily Chronicle' an article on the Forests and Birds in Ashanti. While at Gambaga, the headquarters of the Northern Territories, "good ornithological work was done, and many important forms, including several rare desert Larks, were obtained not only in the district, but to the northward near the Anglo-French boundary, and also in the little-known country around Salaga, which lies close to Togoland, where the German officers have lately been doing much good scientific work. The Ornis of the Hinterland varies considerably to that of the forest region, but many of the same forms are still to be met with. The birds on the whole are not nearly so bright in plumage; the brilliant Golden Oriole, however, is present, but the effects of its plumage lose in the great expanse; its colours need the subtle light and shade of the forest to enhance their beauty. Many of the species obtained at Gambaga are Senegambian, but, besides these, several forms from Kordofan, Abyssinia, and Eastern Africa are represented. The fact of species in North-eastern Africa being found right away up in the Gold Coast Hinterland is very remarkable, and makes it difficult, till further investigation, to assign any sharply defined area for the distribution of West African birds. The movements of birds depend to a very great extent on the rainfall, which, in its turn, is influenced by geographical features, such as forests, deserts, or mountains. The courses of rivers must influence to a great extent the distribution of species. This is readily noticed by observing the vicinity and banks of African rivers, for there numbers of birds may be seen congregated and continually moving up and down the courses. A glance at the map will show what a network of watercourses there are from Senegambia to the Nile. For instance, the Senegal is practically within touch of the Niger, and the later with Lake Tchad; and so on. Furthermore, it must be remembered that tributaries, waterless in the dry season, become during the rains swollen rivers, and this is the period of the year when birds migrate. We know very little about the avifauna in the great bend of the Niger, Haussaland, and nothing concerning the regions about Lake Tchad and Darfur."

IN the Report of the South African Museum for 1900, just received, we much regret to read of the death of Col. J. H. Bowker, who died, at the age of seventy-three, at his residence near Malvern, in Natal. He was one of the oldest of South African naturalists, and since 1872 had constantly contributed to the Museum Collections; he was

also the first entomological explorer of the Transkei and Basutoland, where he held official appointments. He was specially interested in the Diurnal Lepidoptera, and was a collaborateur with the late Curator, Mr. Roland Trimen, in his well-known work on South African Butterflies.

IN the year 1875, the late Mr. Joseph Wolf painted, in his own inimitable and masterly style, a picture of the Labrador Falcon for his friend Mr. H. E. Dresser. For years past this picture has been a source of delight to the numerous friends of the well-known author of the 'Birds of Europe,' who, after their repeated requests that he would allow it to be reproduced, has consented to a small number of impressions being made by the three-colour process. The size of the reproduction, exclusive of margin, is $7\frac{3}{4}$ in. by $6\frac{1}{2}$ in. Each impression will be numbered and signed by Mr. Dresser, and can be obtained from R. H. Porter.

THE General Committee of the Marine Biological Association of the West of Scotland are in a position to offer the following prizes, to be called the "Fred. P. Pullar Memorial Prizes," offered by Sir John Murray, the Honorary President of the Association, in memory of the late Fred. P. Pullar:—

I.—A prize of £50 for a paper on "The Seasonal Distribution and Development of Pelagic Algæ in the Waters of the Clyde Sea Area."

II.—A prize of £50 for a paper on "The Reproduction, Development, and Distribution in the Clyde Sea Area of the Genera *Nyctiphanes* and *Boreophausia*."

III.—A prize of £50 for a paper on "The Formation and Distribution of Glauconite in the Deposits of the Clyde Sea Area and the Adjacent Seas of Scotland."

These prizes are open to investigators from any part of the world who conduct observations in the several subjects at the Millport Marine Station, and who produce, at any time before Jan. 1st, 1905, papers which, in the opinion of a Committee of three scientific men, to be nominated by the Committee of the Association and by Sir John Murray, shall be deemed of sufficient value to merit publication. Those proposing to work for any one of these prizes should make known their intention to the Secretary of the Association, Mr. John A. Todd, 190, West George Street, Glasgow, in order that the necessary arrangements may be made.

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BRIEF NOTES ON AN EXPEDITION TO THE NORTH OF ICELAND IN 1899.

By F. COBURN.

I SPENT the summer of 1899, alone, exploring the North of Iceland for ornithological purposes. My primary object in visiting that island was to study the breeding haunts and habits of some British birds who do not, or rarely do, breed in this country; and to procure specimens, especially the downy young, to assist in completing, as far as I can during my lifetime, the series of educational pictures depicting the life-histories of British birds, upon which I have been already engaged about ten years.

I was totally ignorant of the island and the people, and could obtain no reliable or satisfactory information in this country until the very eve of my departure; the only books I had access to being Pajkull's 'Summer in Iceland,' and Shepherd's 'North-West Peninsula of Iceland.'

From the scant information I could glean, I quite expected that I should have to lead a wild life, and therefore fitted up my expedition with tents and all necessaries, provisioning myself for two months, which I considered, with the assistance I might obtain from the inhabitants and my guns, should make me safe for four months, if necessary. I had not, however, been on the island many days before I found that most of these preparations had been so much worry, hard work, and money practically

thrown away; for I quickly discerned that it would be advantageous to discard my tent and rations, and throw in my lot with the farmers wherever I went, paying them for the accommodation of myself and guides. These people are very poor—from our standpoint—and gratefully appreciate the money which some travellers spend with them; while they certainly resent the action of those who take their tents and provisions, and get all they want out of the country, leaving the smallest possible amount of money behind them. The action of the Icelanders on this score I consider to be perfectly justifiable; and I would advise any naturalists who contemplate travelling in this wonderland to prepare themselves for “roughing it,” to engage a first-class guide, and put up with whatever the farmers can supply in the way of food. The Icelanders’ mode of dining appears strange and rough at first, but the climate and the rough life one leads are so bracing, that one does not think of how things are cooked, or what it is which is placed on the table. I had nothing to complain of in the good houses; the great desire is to get something of some kind to satisfy hunger. I was certainly put to sore straits at times, when the calculations of my chief guide, Sigurdur Samarlidason, miscarried, and sighed for my tent and provisions, which I had come to regard as nothing but an encumbrance; but these were exceptions, and I should never hesitate to adopt the plan again, even if I knew that greater hardships were in store than those I have already gone through.

At the outset I was confronted with great difficulties in consequence of the strictness of the law as to shooting birds in the close-time, and once thought I might just as well pack up my traps, and return by the first vessel I could find; but ultimately I firmly determined that, after all my preparations, I would not do so until I had exhausted every art of diplomacy of which I was capable. The result was that, in an interview with the chief magistrate for the north and east portions of the island, I so enlisted his sympathies in the educational works I had in hand, that he said he considered he ought to be in a position not only to give me the permission I asked for, but to render me every assistance in his power; but the law was made—a bad law he believed it to be—and he could not alter it. However, bit by bit, I gained concession after concession, until eventually

I was armed with magisterial authority to procure all I needed; provided I made arrangements with the farmers in the different districts I visited, and paid them for permission to get specimens on their ground. I was led to understand distinctly that the land belonged to the farmers, and whatever that land produced was their property. There is practically no unclaimed land in the North of Iceland. My trusty guide and interpreter—he is one of the best guides in Iceland—who I had engaged for the whole length of my stay, used this magisterial permit—and perhaps amplified it—with such success wherever we went, that I was almost everywhere received with the greatest kindness and respect, the people certainly trying their very utmost to assist me in procuring all I needed; and in the more remote districts no small potentate could have expected greater consideration than was accorded to me. I have said *almost* everywhere; there was one solitary exception, and this at the time—and the point farthest north which I had reached—when I was becoming utterly worn out with hard work, and during the last and most disastrous journey I made, which so disheartened me that I determined to bring my wanderings in Iceland to a close.

The plan I adopted was to have a base of operations in the different districts, and make journeys in different directions from that base; none of these journeys exceeded three days in duration, but it was at such times that I occasionally felt the need of a tent and proper provisions.

The land was to me a veritable paradise, teeming with bird-life almost everywhere; the birds appearing in such a manner that it was easy to observe their habits. It is so different with our wild and wary creatures at home.

Somewhere about sixty-six species came under my observation either directly or indirectly, and to the bulk of them I shall have to refer in the briefest possible manner, enlarging only in the more important cases. To refer to all the interesting traits of character I studied would need a volume of 'The Zoologist' instead of a few pages. I consider that I accomplished more useful work in the few weeks I spent in the land than I could have done in many years at home.

Although great fields of snow can be seen on the mountains everywhere, the climate in the valleys is mild and delightful;

except during rain or fog, when the cold penetrates almost to one's marrow. My health was almost extravagantly good ; better than it had been for many years previously.

This was my maiden effort at exploration away from our own shores. The following pages will show how successful it was.

The Icelandic names of the birds are placed in brackets. I have taken them from Gröndal's 'Skýrsla' (Skýrsla, un hid Islenzka náttúrnfræðisfelag, árid 1894-1895. Reykjavik, 1895). This, I consider, better than trusting to the spelling of the names given to me by the inhabitants.

REDWING, *Turdus iliacus*. (Skógarpröstur).—Fairly abundant in the districts where birch-scrub abounds. Very wild ; more so, in fact, than they are with us during the winter. I was utterly disappointed with the song ; it is the weakest, shortest, and most unmusical song I have ever heard from a Thrush, and I could not believe that I was listening to one until I located the bird with my glasses. My specimens differ in plumage from any other Redwings I have ever seen, and are in Dr. Bowdler Sharpe's hands for determination. I procured adult male and female, nest and eggs, and nest with five young just hatched.

WHEATEAR, *Saxicola ananthe*. (Steindepill).—The small dull-coloured race. Plentiful in all districts I visited. I got adult male and female, and young in first and second stages.

ICELAND WREN, *Troglodytes borealis*. (Músarrindill).—I saw this bird once only, and then it was like a mouse gliding into the scrub. All Icelanders knew the bird by name, but very few had ever seen it.* That name was invariably "músarrindill"; I never heard it called by any other in the north. The Rev. H. H. Slater, in his recently published 'Manual of the Birds of Iceland,' curiously enough, has never heard this name used, notwithstanding his fifteen years' experience in Iceland. Músarrindill means "Mouse-bird."

WHITE WAGTAIL, *Motacilla alba*. (Maríu-erla, &c.).—Common almost everywhere, and the only species of Wagtail to be found in Iceland. I procured a perfect series: adult males and females ; first, second, third, and fourth stages of the young ; the change from summer to winter plumage ; nest and young ; nest and eggs ; and, a great rarity—nest with white eggs.

* As a matter of fact, throughout all my wanderings I made incessant inquiries, but only found one shepherd-boy who had ever actually seen the bird, and that was near where I saw my solitary specimen.

ROCK-PIBIT, *Anthus obscurus*. (No Icelandic name.)—I found this bird in all the Færøe Islands, and took a nest and young from a stone wall at Klaksvig. In Iceland I only once met with it in Vopnafjord, and then attached no importance to it, and did not attempt to procure the specimen, being unaware that it had never been recorded from Iceland. I do not think that I could have been mistaken in a bird with which I am so thoroughly familiar.

MEADOW-PIBIT, *A. pratensis*. (Páfutitlingur.)—Common in most districts, and resident. From observations I made I thought this bird ought to be separated from *A. pratensis*, and Faber's name, *A. islandicus*, restored; as I detected a slight difference in the song, in the structure of the nest, in the plumage of adults and young, but, most important of all, in the fact that the colour of the inside of the mouth, in the nestling, is flesh-white, as compared with the scarlet orange in our bird. After more mature study, however, and the examination of various stages of the young of our bird during the present season of 1901, I think it best not to further discuss the question until I have paid another visit to Iceland to satisfy myself that the more important characters are permanent. I obtained adult male and female, various stages of the young, and nest with five young just hatched.

PIBIT, sp. ?.—I made a special visit to the least known portion of a lovely valley, the sides of which were clothed with dense forests of birch, some of the trees being from ten to fifteen feet high. The undergrowth was as dense as in many English thickets, and to penetrate this was a matter of considerable difficulty. I was lying concealed in this undergrowth, watching Hornemann's Redpoll, when I heard the vigorous song of a bird which was totally new to me. Cautiously observing, I saw, to my utter astonishment, a small Pipit clinging to an upright slender shoot of birch, precisely as a Whitethroat or Sedge-Warbler would do. When I made my appearance the bird left the twig, and, mounting into the air, continued its song, and flew right across the wide valley, singing the whole time, finally settling in a birch on the opposite side. These movements I followed with my Zeiss binoculars. My attention was shortly afterwards directed by Sigurdur to a little bird skulking amongst the thick scrub, and running along the twigs with as much dexterity as a Grasshopper-Warbler would do. Its movements were so quick, and the scrub so dense, that I could not see what the bird was; but, bringing it down, I was again amazed to find that it was one of the little Pipits I had just been watching. The markings of the feathers are very similar to those of the Icelandic Meadow-Pipit, but the bird is conspicuously more slender in build, although the wing-measurement is the same in both species,

but the habits and song are totally distinct. The Meadow-Pipit was plentiful enough in the lower portions of this valley, and was in song; but I found this bird only amongst the trees, and did not once see it on the ground. While searching, I came across a very curious nest, and deeply regret now that I did not bring it away with me; but I could not determine at the time whether it was an unfinished one, or disused. It was constructed entirely of grass-stems, and was placed about a foot from the ground, on the top of a tangled mass of twisted birch-scrub. The only other small birds breeding in this forest were Hornemann's Redpoll and the Redwing-Thrush. The nest did not belong to either of those birds; indeed, it looked like nothing but a Pipit's nest, although in such a singular situation. At this place I found a very intelligent young man, who appeared to take great interest in the birds, and he gave me, through Sigurdur, some very interesting notes about Hornemann's Redpoll. He took me to see a nest of young Pipits; it was placed on the side of a bank just as were other Meadow-Pipits' nests I had found; he was very anxious for Sigurdur to make me understand that it was the nest of the *ground* Titlingur, which led me to think that he knew of some other kind of Titlingur. I was forced to hurry away from this valley, but arranged to return and thoroughly investigate the question of this interesting little bird; but, alas! my plans miscarried, and I had not the opportunity to follow up my inquiries.

I have recently submitted the only two specimens of this bird which I brought back to Dr. Bowdler Sharpe, who, after much consideration, was inclined to regard them as new, but wished me to convey his views to Dr. Hartert at Tring, and ascertain whether there were any specimens in the Brehm collection like them. We went through the collection, and certainly found some wretched old specimens which did approach them in some features, but, just as certainly, we found nothing quite like them. However, Dr. Hartert determined that the external characteristics of my birds were not sufficiently distinct to form a good diagnosis. I admit this, and admire Dr. Hartert for his caution; but in a class of birds like the Pipits, which so closely resemble each other in plumage, surely something else must be taken into consideration; and I was certainly surprised that he attached no importance to the difference in song and habits. I always thought this was of vital importance; if it is not, how can we separate Marsh-Warbler from Reed-Warbler, or Chiffchaff from Willow-Wren? I have set forth these facts fully, as I am far from being convinced; and if I, or others, again penetrate to the remote spot in Iceland where

I found these birds, and bring back more conclusive evidence, I think the bird will eventually be considered new.

HORNEMANN'S REDPOLL, *Acanthis hornemanni*. (No Icelandic name.) According to the Rev. H. H. Slater, this bird has been known as Icelandic from a solitary specimen, of uncertain locality, procured by the late Mr. Proctor. It is therefore a matter of importance that I found this bird breeding in the forest above referred to; as it not only places the bird on a sound footing, but gives a new breeding bird for Iceland, and, I think, Europe as well. I brought back adults, and nests and eggs, which have been identified by Dr. Bowdler Sharpe and Mr. Eugene W. Oates.

SNOW-BUNTING, *Plectrophenax nivalis*. (Snjótitlingur.)—Common in many districts. I was charmed with the song of this bird; when heard in the great solitudes, high up on the mountain-sides, amongst the masses of black lava and patches of snow, it struck me as being the sweetest Bunting's song I had ever heard. I procured a perfect series of this bird—nest and eggs, and every stage of young and adults. I have one very remarkable young bird, with legs and bill abnormally large.

RAVEN, *Corvus corax*. (Hrafn, &c.)—Plentiful in some districts. I found them breeding on the cliffs as late as July. I did not procure any specimens, but regret that I did not bring back a skin which I was offered, as it has since occurred to me that it was of the enormous billed American race.*

CARRION-CROW, *C. corone*. (Færeyya-hrafn.)—I saw several of these birds once only, and that was in Seydisfjörð.

SNOWY OWL, *Nyctea scandiaca*. (Ugla, &c.)—I did not personally meet with this bird, but several skins were brought to me. I was assured that the bird had never been known to breed in the North, and rested there only on migration.

WHITE-TAILED EAGLE, *Haliaëtus albicilla*. (Orn, Ari, &c.)—I saw a grand adult with white head and tail sailing over Lake Myvatn, but it never came within three hundred yards. This same solitary bird is said to have been seen in the district for ten years, but never with a mate.

ICELAND FALCON, *Falco islandus*. (Fálki.)—I found this magnificent Falcon in moderate abundance in certain districts, and witnessed several striking scenes in connection with it. I scaled a vast pinnacle of rock (lava, and very rotten in places) to the eyrie; this was real

* Since the above was written I have examined the collection at Tring and Dr. Hartert points out to me that the Greenland form has a very large bill.

cliff climbing, and very different to being comfortably lowered down a cliff by ropes. On the top there was only just room to move about, and to look into the eyrie I had to lay flat down, with two natives firmly clutching my legs to prevent me falling over the dizzy height. I was attacked by the parent birds, but secured the four big fluffy-white screaming young. It was a magnificent experience. I also shot adult females, and female in first plumage. I could have brought back more, but refrained from doing so.

MERLIN, *F. asalon*. (Smirill.)—Plentiful in many districts. Very bold. I saw some remarkable scenes between this bird and the Arctic Tern. I did not procure any specimens, as my series of this bird at home is complete. I have regretted, however, since my return, that I did not procure specimens of all the different kinds of birds I saw.

CORMORANT, *Phalacrocorax carbo*. (Dilaskarfur.)—Common round those parts of the coast I visited.

SHAG, *P. graculus*. (Toppskarfur.)—These also were plentiful in some parts.

GANNET, *Sula bassana*. (Súla hafsúla.)—Common, but I did not visit any of the breeding haunts.

GREYLAG GOOSE, *Anser cinereus*. (Grágæs.)—There has been so much confusion and uncertainty as to the species of Wild Goose breeding in Iceland, and the situation of the breeding haunt, that I am very pleased to be able to increase our knowledge on the subject. Shepherd's great journey in 1862 was undertaken chiefly with the object of settling this problem, but he totally failed, as have others who followed him, excepting the Brothers Pearson.* Gróndal asserted that the breeding bird was the Bean-Goose, and all eggs which have been sent to England from Iceland were said to be those of *Anser segetum*. The Rev. H. H. Slater, in the book before cited, suggests that the breeding haunt would eventually be found in the desert interior, and kindly offers, in 1901, to render any assistance he can to anyone who will brave the personal discomforts and expense of a summer in exploring the Skjálfandafjót River. I braved all these discomforts in 1899, and ascended the river from its mouth at Husavick to the breeding haunt, and that journey furnished some of the most interesting adventures throughout my wanderings. The breeding haunt is *not* in the interior, but is *below* Góða-foss. The situation is most remarkable, and is practically inaccessible, save to the farmer who lives nearest to it, and who alone can guide the traveller in safety. Well below Góða-foss the river bifurcates; one portion falling over vast cliffs, and forming the grand falls of Ullar-foss; the other the equally beautiful falls of Barna-

* 'Ibis,' 1895, p. 237.

falls-foss, neither of which appear to be marked on recent maps. At this spot it is clearly to be seen that the valley of the Skjálfandafjöt has been formed as the result of a mighty subsidence, snapping off here, and forming vast, jagged, and inaccessible cliffs. At the base, and extending far down the valley, there is a vast mass of *débris* of basaltic rock, the lumps varying from some hundreds of tons weight downwards; all in wild confusion. Amongst this, which abounds in treacherous quick-sands, the two arms of the river flow in numerous rapid and dangerous channels, eventually forming one river again. It was in and out amongst these channels that the native had to guide our horses with the utmost caution, and in a bewildering manner, giving the strictest instructions not to diverge a single foot from the track of his leading horse. Eventually he brought us on to the top of the cliffs. From here, to the point of bifurcation of the river, the land forms a great and long triangular-shaped island, clothed with the richest of vegetation. In the middle of this island there is a great space covered with black sand, and strewn with masses of black lava. This is the breeding haunt of *Anser cinereus*. It is in such an exposed position that the sitting birds can see the approach of an enemy long before one is within gun-range—even of a 4-bore—and take to flight. The eggs are placed on the sand, without any nest, and can be very easily seen. They are systematically taken by the farmer, and I was most positively assured that *all* the Wild Goose eggs which have been sent out from the North of Iceland were procured from this spot, this assertion being subsequently confirmed to my complete satisfaction. My guide was assured by the farmer that I was the first Englishman—Englisher—he had ever seen in those parts.

I saw two considerable flocks of the birds—they were all Greylags—but the bulk of them had finished breeding, and were scattered lower down the river. These birds performed marvellous feats in the water, upon the edge of the mighty falls, which absolutely astounded me, and which I could not have credited had I not seen them. After about seven hours' chasing—the adults were in the moulting stage—I brought one party to bay on the edge of the cliffs. It was a dangerous spot, but afforded the only chance I should probably ever get. Scrambling down on to a narrow ledge, where there was only just room to stand, my faithful guide following and approaching as near as he could, with outstretched hands to receive me in case I was over-balanced by the recoil of the gun, I shouldered the ponderous 4-bore, and, to my delight, killed four birds at one shot—two adults and two young covered with yellow down. I recovered the two adults, but, alas! the two young, which I should have prized most, toppled over

the cliffs, and fell a tremendous depth below, by the side of the falls. I descended the cliff in my eagerness to recover the prizes, until I was actually under the falls, and fully appreciated the meaning of the name Skjálfandafjót—"shivering or trembling"—and having reference to the shaking of the cliffs, by reason of the great body of water falling over. All my efforts were fruitless; the little birds had either fallen into the raging rapids, and been carried away, or into holes between the masses of lava. Afterwards I shot another splendid gander—judging by his size—but found it utterly impossible to recover his body, and saw it eventually carried away by the rapids. However, I had now thrown much more light on the problem, and, after fondly gazing at my two victims, I gave orders for the return with all speed to a farm where we could get rest and food. This we reached about 10 p.m., after fasting fourteen hours.

I made exhaustive inquiries on my return down the valley, and was most emphatically assured that the birds I had procured were the only kind of Wild Geese which breed in that part of Iceland, and that there was no other breeding haunt known in the whole North of Iceland than that I had visited, and, some said, in the *whole* of Iceland. I carefully explained the difference in the colour of the bill between *A. cinereus* and *A. segetum*.

WHITE-FRONTED GOOSE, *A. albifrons*. (Grágæes.)—I did not meet with this bird, but it is well known to the farmers down the valley of the Skjálfandafjót, who told me that it was met with only resting during migration, and most emphatically assured me that it had never been known to breed in Iceland. This I heard first from the farmer at the breeding haunt of *A. cinereus*, and it was confirmed by others lower down the valley.

WHOOPEE SWAN, *Cygnus musicus*. (Alft.)—Saw four of these birds at Myvatn, but did not procure any specimens. It appears to be rare as a breeding species in the North.

MALLARD, *Anas boscas*. (Stökkönd.)—Fairly plentiful in some districts. I procured female and downy young only.

GADWALL, *A. strepera*. ("Litla gráönd.")—This is another bird surrounded by much confusion and uncertainty. Gróndal does not know the bird, and most of the Icelanders with whom I came in contact did not recognize it. I think they confuse it with the female Mallard. Slater, during his fifteen years' experience, only saw the bird once, and then not with much certainty. I saw the adult female on at least four different occasions, but there was a succession of vexatious incidents, which are calculated to cause one to think of unparliamentary language, if not to use it, and which prevented me securing a specimen.

However, I got five downy young, which I value very highly; they very closely resemble the young of the Mallard, but may be known by their shorter and narrower bill—shorter than the head—and the presence of lamellæ. The female is a very noisy bird at times, when she loses her young, for instance. A skin was brought to me, which I regret I did not secure, as it was in very dark plumage, and was undoubtedly the male in the eclipse stage.

PINTAIL, *Dafla acuta*. (Grafönd.)—I met with it frequently, but it is very wild and wary. I got adult female and downy young.

TEAL, *Querquedula crecca*. (Urt.)—Plentiful in several districts. I procured adult female, downy young, eggs, and down.

TEAL, sp. ?.—I saw a Teal with a very dark back, leading four very dark young towards the water. I mistook her for the Common Teal, and, having procured the above, did not intend to interfere with her. In her solicitude for her young she feigned lameness, and in so doing expanded her wings, when I saw *one broad white band* across, above a green speculum. I made repeated efforts to secure her, but failed. What species could this have been?

WIGEON, *Mareca penelope*. (Raudhöfda-önd.)—Common in many districts, especially the interior. I procured adult females, a good series of downy young, eggs, and down.

AMERICAN WIGEON, *M. americana*.—This is probably the most important discovery I made. To be the first to find this splendid duck breeding in Europe gives me the greatest satisfaction. I cannot refrain from expressing surprise that all the ornithologists who have preceded and followed me in Iceland should have failed to discover this striking bird. The very first duck I shot when I finally landed in Iceland was a female *Mareca americana*, and the very first downy young I secured were three—full clutch—of this species. Subsequently I got the adult male, and saw another adult male in eclipse dress; female and about five downy young, which I could not secure; and still another adult female. I met with the bird in three different districts, in two of which it was breeding. The Icelanders knew the male well enough, although as a rare visitor, but regarded it as being only a variety of the Common Wigeon. The female they could not distinguish at all.

This (the female) is a most distinct looking bird in the field, and could not be mistaken, when its characters are understood, by anyone whose eyes were properly accustomed to the appearance of the female *Mareca penelope*. It is much stouter in build; indeed, the difference appears to be as great as that between a person of ten stone and another of fourteen stone. The instant I saw my first bird I was so struck by

its appearance that I examined it long and earnestly through my glasses, with the result that I allowed it to escape; but the second I saw was promptly secured.

This discovery of the breeding of what has hitherto been considered a strictly American bird in Europe will certainly be a subject of great interest not only to ornithologists here, but to those of America, and the Continent as well; and will certainly strengthen the hitherto somewhat shaky position of the species as a British bird. As will be gathered from the foregoing, I brought back adult male and female, and three downy young. I am having a plate prepared, which will show at a glance how to distinguish between the female and young male of this bird and the Common Wigeon.

SCAUP, *Fuligula marila*. (Dúkönd.)—One of the commonest ducks. I found the nesting-sites and the nest of this duck to vary to a most remarkable extent. One nest was built up from the bottom of the lake, until the top was brought under the shelter of a mass of large leaves of the marsh-marigold. The mass of vegetable-matter and mud used would have filled a large wheelbarrow. I brought the top portion and the eggs away.* I got adult females, plenty of downy young, nests, eggs, and down.

BARROW'S GOLDEN-EYE, *Clangula islandica*. (Húsönd.)—Very common in some districts. All writers, even to the latest, on this handsome duck intimate that it is difficult, if not impossible, to distinguish between the female of this and our Golden-eye (*C. glaucion*). In the very first couple of these birds I shot—they were the first I had ever handled—I noticed a peculiarity of structure which I had never seen in any duck before, and one which would certainly instantly distinguish between the female or young male and our bird; it is also present in the downy young. I procured an unusually large series of females to satisfy myself that the character was permanent, and on my return examined a good series of females of our bird. I am having a plate prepared, showing these distinctive characters. I gathered much very interesting information concerning these birds. I brought back adult males (summer and winter), adult females, plenty of downy young, eggs, and down.

LONG-TAILED DUCK, *Harelda glacialis*. (Hávella.)—The commonest breeding duck everywhere. I got adult male in eclipse dress, adult females, plenty of downy young, eggs, and down.

HARLEQUIN DUCK, *Cosmonetta histrionica*. (Straumönd.)—This magnificent duck is common on most of the wild rapid rivers. The

* In the nest was a tiny egg, which the Icelanders averred was the last the bird would ever lay.

breeding haunts are amongst some of the wildest and most romantic spots in Iceland. I had some narrow escapes from drowning in trying to recover downy young which I had shot. The female is a noble duck in the defence of her young. I obtained adult male in breeding dress, and in the rare eclipse stage—hitherto unknown; adult females, a good series of downy young, eggs, and down.

EIDER-DUCK, *Somateria mollissima*. (Ædur.)—Simply swarming everywhere along the North coast. A strictly protected bird. I got adult male and female, a good series of downy young, nest, eggs, and down.

KING-EIDER, *S. spectabilis*. (Ædarkóngur.)—A very intelligent farmer, who could speak English fluently, knew this duck perfectly, and described the peculiarity of the bill. He assured me that it bred frequently, but occasionally, amongst his other Eiders; it had not appeared the season I was there. However, I saw some small dark-looking Eiders which puzzled me, and wanted to secure one, but Sugurdur would not let me, as he was afraid of this farmer. If I had seen the farmer before I did the ducks, I am afraid I should have accidentally killed one of them.

COMMON SCOTER, *Edemia nigra*. (Hrafnöld.)—Not plentiful, in my experience. I procured adult female, downy young, eggs, and down.

GOOSANDER, *Mergus merganser*. (Toppönd.)—I did not meet with this bird, and only saw the skin of an adult male which had been shot on Lake Myvatn. I was told that the bird formerly bred in the district, but has now deserted it.

MERGANSER, *M. serrator*. (Litla toppönd.)—Fairly abundant. I got downy young only.

ROCK PTARMIGAN, *Lagopus rupestris*. (Rjúpa.)—Very common, some of the moorlands in the North swarming with them. I saw broods of twenty. This is altogether the most stupid bird I have ever met with. It trusts so blindly to its protective colouring that I really think it believes itself to be invisible. This was far from the case to my eyes, for I could detect them far more quickly than the Icelanders could. I saw some very fine instances of protective mimicry, however, in this bird. I obtained males and females in summer, autumn, and winter plumages, every stage in the growth of the young bird, from just hatched up to nearly full-grown, nest, and eggs. The little chick can fly when about three days old.

RINGED PLOVER, *Ægialitis hiaticula*. (Sandlóa.)—Fairly abundant. The first of these birds I saw puzzled me exceedingly, as their upper parts were of a light chocolate colour. I could not procure specimens,

as I had not unpacked my guns. All those I saw in other districts were the normally coloured birds with which I am quite familiar. When I returned to the first place, about five weeks later, my eyes were opened to the fact that it was a most striking and interesting case of conscious protective mimicry. At all events, I think, when I can give full details, it will be found to be so. I procured males, females, and downy young. I found this bird breeding far towards the interior districts.

GOLDEN PLOVER, *Charadrius pluvialis*. (Heidló, &c.).—The commonest of Iceland birds, being abundant everywhere. I was charmed with its sweet, flute-like, tootling song, and tried to syllable it after I had heard it perhaps thousands of times, and was then listening to it. An utterly absurd failure, as it is with the attempt to syllable nearly all other birds' notes. I got a perfect series of this bird, from the young just hatched, and every possible stage up to full-fledged; also a good number of adult males and females. This was one of the very few birds of which I procured more than I actually wanted for my series.

OYSTERCATCHER, *Hematopus ostralegus*. (Tjaldur).—In moderate numbers in some districts. I did not trouble to procure any specimens.

RED-NECKED PHALAROPE, *Phalaropus hyperboreus*. (Odinshani).—In some districts as common as Sparrows in a barn-yard. I could write long chapters on the habits of this fascinating little bird. I discovered, notwithstanding assertions to the contrary, that the male performs the sole duty of hatching the eggs and rearing the young, the female leaving after the eggs are laid. My evidence is, I think, conclusive. I am aware that an American observer, I believe, has made a similar discovery with regard to the allied Grey Phalarope (*P. fulicarius*). My series of this bird is a remarkably complete one. Adult males and female in summer stages, and changing to winter; young in every conceivable stage, from just hatched to full-fledged; nest and eggs. I do not consider that the full-fledged young has been properly described.

COMMON SNIBE, *Gallinago caelestis*. (Hrossagaukur).—Met with very sparingly, and only in certain districts. I only procured one adult. A curious looking bird, but it cannot be other than the Common Snipe.

DUNLIN, *Tringa alpina*. (Lóupræll).—Very abundant. The small, race. I procured adult males, females, and young.

PURPLE SANDPIPER, *T. striata*. (Sendlingur).—Plentiful in some parts. I went to several breeding haunts, but had to leave before I had procured eggs, and when I returned was too late for downy young.

I got adult males and females and fledged young, but with the heads still covered with down. The young in first plumage have not been properly described. Those which reach our shores in the autumn, with the pale margins to the feathers, and which Seebohm describes as first plumage, are practically the third stage, and acquired by moult. There are two stages in the plumage of the young bird after the downy stage, acquired without a moult, and which are quite distinct from the autumn bird.

REDSHANK, *Totanus calidris*. (Stelkur.)—In fair numbers in many districts. I obtained adult male and female and downy young. My adults are very heavily barred, more so than any I have ever seen before, and have practically no white under parts.

WHIMBREL, *Numenius phaeopus*. (Spói.)—Another of the commonest of Iceland birds. Very bold and very noisy. I have seen these birds mobbing the Iceland Falcon. I made some fine studies of this bird, and shall be able to produce some striking pictures. The series I obtained is a very complete one, from eggs, and every stage of young, just hatched and grading up to full-fledged.

ARCTIC TERN, *Sterna macrura*. (Kria.)—Very abundant everywhere, and in some parts of the North in vast colonies. I found it far away in the interior—in the Reindeer districts. I made many studies of this bird, but must not touch upon them, as I am occupying far too much space already. I obtained adults, every possible stage of young, and a series of eggs.

GREAT BLACK-BACKED GULL, *Larus marinus*. (Svartbakur.)—Very common in the North, and sparingly in the interior. I did not trouble to procure any specimens.

LESSER BLACK-BACKED GULL, *L. fuscus*.—I saw this bird at Thors-havn, in the Færoes, and, in Iceland, one only in Nordfjord. I attached no importance to this, as again I did not know at the time that the bird had not been recorded for Iceland. It need not be suggested that my eyes deceived me, or my ears either, as I carry the Zeiss binoculars. I did not procure any specimens, as my guns were not unpacked.

GLAUCOUS GULL, *L. glaucus*. (Grámáfur.)—It will strike some as being curious when I say that throughout all my wanderings I met with three specimens only of this bird, and they were immature. It is a bird not to be mistaken.

KITTIWAKE GULL, *Rissa tridactyla*. (Rita.)—Very abundant—in some places in vast numbers. As my series of this bird at home was complete, I did not trouble to procure many specimens. I brought

one only. I noticed that there was only one of the primaries with a white spot.

GREAT SQUA, *Stercorarius catarrhactes*. (Skúmur.)—I saw this bird many times, but did not procure any specimens. I ascertained the locality of a breeding haunt, but had no time to visit it.

POMATORHINE SQUA, *S. pomatorhinus*. (Kjóí.)—I saw a Squa in Seydisfjord with twisted feathers in the tail, which I concluded was this bird.

RICHARDSON'S SQUA, *S. crepidatus*. (Kjóí.)—Abundant. I detested the bird for its bullying propensities, but marvelled at its wonderful powers on the wing. I obtained an abundant series of the dark- and light-breasted ones, and every intermediate stage. These are not two forms; I believe it will be found that the white-breasted birds are simply completely adult, and that the bird needs several years to reach that stage. Young birds may mate with adults, and young birds may breed, as with some other Gulls. On dissection I found both males and females amongst both dark and light birds.

RAZORBILL, *Alca torda*. (Alka.)—Very common. I did not trouble to procure more than one specimen, as my series is complete.

LITTLE AUK, *Mergulus alle*. (Haftirdill.)—I saw a flock of very small sharp-winged swimming birds on entering Eyjafjord, which must have been of this species.

GUILLEMOT, *Uria troile*. (Langvia.)—Very common. I did not need any specimens.

BRÜNNICH'S GUILLEMOT, *U. bruennichi*. (Stuttnefja.)—I visited some islands off the North coast in search of this bird, and it proved to be one of the most disastrous and unsatisfactory of all my journeys. I was too late for one thing, as the birds had all left the breeding rocks. I saw several on the sea, and recognized them at once by their slightly larger size, and black upper parts, as compared with the Common Guillemot. The fishermen confirmed me that they were Stuttnefja, and not Langvia. I tried to procure them with my 4-bore, but I was so numbed with cold fog, and the swell from the islands was so great, that I missed. In the boat I was almost up to my knees in water for many hours. I landed on one of the islands—a most difficult matter—and explored the top; while the physical features of the second island were so marvellous, that I do not regret having had to grope about a fog-bound sea until near one in the morning. Numbed with cold to the very marrow, soaking wet, and sick with hunger and fatigue, the only accommodation I could get on shore, at the wretched hut of the fisherman, was a basin of cold milk, and, thank heaven! a cup of *hot* coffee. I had to sleep in a hole in the ground, and next

morning could get but a repetition of the cold milk and hot coffee. It was eight o'clock p.m. on the third day before I reached civilization and food. That fearful fog did not lift for four days, and I believe it was this same fog which led to the tragic suicide of the navigating lieutenant of H.M.S. 'Blonde,' the officers of which I had previously met at Husavick. I did not hear of this sad event until I returned to England.

BLACK GUILLEMOT, *U. grylle*. (Teista.)—Very common. I procured adults only, and those were on the island above referred to.

PUFFIN, *Fratercula arctica*. (Lundi.)—Also very common. I procured one adult, and one young covered with down, from the top of this island. The nesting-holes were unusually long in which the birds were breeding, and it was a very difficult matter to get to the young.

GREAT NORTHERN DIVER, *Colymbus glacialis*. (Himbrimi.)—I found this bird distinctly rare in the North, and only saw about four specimens, two of which were on the coast. I obtained a splendid adult and two eggs.

RED-THROATED DIVER, *C. septentrionalis*. (Lómur.)—This was the common species of Diver, and in one district I saw as many as twenty at one time. I obtained adult male and female, young in down, and young in first plumage.

SLAVONIAN GREBE, *Podiceps auritus*. (Sefönd.)—Very abundant in some districts. I found no nests as actual floating structures; they were all built up from the bottom of the lake, until the surface of the water was reached. The commonest site was under a projecting mass of lava, without any surrounding vegetation, and the eggs could be distinctly seen a long distance away. I obtained a good series of adults, young just hatched, young half-grown, and nest and eggs.

FULMAR, *Fulmarus glacialis*. (Fylúngur.)—Plentiful at sea, but I did not visit any breeding haunt.

I was absent from Birmingham just over eight weeks. Eighteen days of this time was spent on board the Danish mail steamers during the outward and return journeys; so that I had actually less than six weeks on land in the North for collecting. During this time I procured 330 specimens of birds, a splendid series of nests, eggs, and down; skinned and preserved all my specimens, labelled them, and made elaborate separate notes on soft parts, and measurements. I wrote up my journal daily, when it was possible to do so, recording my observations upon the habits of

birds, and the physical features of the wonderful land I was passing through, and the interesting type of people I met. These daily observations covered 530 pages of note-books. When it is remembered that several of my journeys after one particular species of bird occupied two and three days, and that I was constantly in the saddle, and covered great distances almost daily, it will be readily understood that I had not a single idle moment. Indeed, I gave myself only about half my usual time for sleep. The unbroken daylight was of great assistance to me, and I was strong and vigorous for each day's labours, although I might have been hard at work until 3 or 4 a.m. Towards the close, however, I became so utterly worn out with the unceasing strain, that I felt that I could not continue without a period of rest, and, as previously stated, resolved to return home. The whole journey was studded with stirring adventure, and I had several narrow escapes from losing my life, both by drowning and other causes.

It is a pleasure to me to be enabled to state that the bodies of every bird I shot and recovered are made into good skins or mounted specimens, and were needed for the series I was preparing. Not a single bird was needlessly shot; and never for only cooking purposes. I regret that many bodies were lost, but through no fault of mine. This was when birds fell through cracks in the lava, or, in the case of the Harlequin Ducks, when they were carried away by the mad rush of water in the rapids.

The careful mounting of the 330 birds occupied me, after my return, together with other work intervening, over twelve months; another important and laborious task in connection with the Baylis collection occupied still another twelve months; hence the delay in publishing this report.

I feel that I ought not to bring this paper to a close without tendering my earnest thanks to those who assisted in my expedition; and, first of all, a tribute to the memory of F. W. W. Howell, who, alas! lost his life this year (1901) while crossing one of the treacherous Icelandic rivers. I met Mr. Howell quite accidentally about two months prior to my departure for Iceland. We were total strangers, but it was through his kindly and generously tendered advice that many obstacles which others had magnified into insurmountable ones were smoothed away,

and my course made so clear and plain that I had no hesitation whatever in starting on my journey. Mr. Howell was a strictly conscientious man ; he loved Iceland, and laboured hard to open it up to the outside world. His untimely loss will be deplored by none more sincerely than by the Icelanders themselves, who have lost a true well-wisher.

My friend Mr. Henry Cox kindly undertook at the last moment, and when pressure was heaviest upon me, the entire management of the all-important ammunition department ; while Mr. W. T. Wilson, of philatelist fame, gave much valuable information on baggage, pack-boxes (special), and provisions.

Dr. Bowdler Sharpe and others at the British Museum I thank for their kindly consideration in naming some of my specimens. To my chief guide and interpreter, Sigurdur Samarlidason, my unstinted praises are due. He worked assiduously, and, when he fully grasped the character of my undertaking, never wearied of making inquiries wherever we went for information which would be useful to me. To the Icelanders generally, in those districts I visited, my warmest thanks are given for their courtesy and kindness ; they all worked heartily to further my interests, their one desire appearing to be to send me back with as perfect a collection as possible.

The journey has left brilliant memories for me, and I trust that I shall be enabled to redeem my promise, and pay another visit to this paradise of the North.

NOTE ON THE ORIGIN OF SEXUAL DIMORPHISM, AND OF NUPTIAL WEAPONS AND ORNAMENT- ATION.

By G. E. H. BARRETT-HAMILTON.

Not long ago* I suggested, from a consideration of the spawning habits of the various species of *Oncorhynchus*, that secondary sexual characters, as well as the seasonal assumption of nuptial ornaments and weapons, might have had their origin in pathological conditions: that the whole metabolism of the animal is upset in the effort to produce the sexual products, with a result that pigment and matter are set loose in the body, and find their way to new regions, often with a fatal—always with a serious—influence on the animal, but resulting in the production of nuptial adornments and weapons. Mr. Cunningham, in parts of his argument,† comes very near this hypothesis—for instance, when he lays great stress on the influence of the veins as a controlling factor in the evolution of sexual characters. Nevertheless, he is most unfortunate to have missed the Reports of Investigations on the Life-History of Salmon, published by the Fishery Board of Scotland. In these papers both his and my views are supported, and it is clearly shown that in the breeding Salmon, whether male or female, such transference of pigment and matter, both of fats, proteids, phosphorus compounds, and iron, actually does take place.

There remains yet another point upon which I wish to touch. Many naturalists base their arguments on the absence of proof that acquired characters are or can be inherited. Here they have a strong position; but, considering the matter closely, do we find that secondary sexual characters are in all cases inherited? The form and detail of an animal's body exist as the expression of, or owe their structure to, two forces, the one purely vegetative, or due to purely nutritive causes, the other sexual.

* Cf. 'Proc. Camb. Phil. Soc.' vol. x. pt. v. pp. 279-285.

† "Sexual Dimorphism in the Animal Kingdom."

Now, if we remove the generative organs—the origin of sexual activity—we leave an animal purely vegetative, and one in which none, or hardly any, of the secondary sexual characters will make their appearance. They are not then part of the essential vegetative basis of the animal, but a mere expression of its sex. Remove the sex, and we remove them also. Can it then be said that they are hereditary, even although the sexual activity from which they arise be so? I suggest that they are not, although their partial appearance in some cases, even after the destruction of the generative organs (if not due to an imperfect destruction), would seem to show that perhaps they may eventually, after many generations, become so.

What I conceive to happen is somewhat as follows:—In animals which exhibit neither sexual dimorphism nor seasonal armature or ornamentation, the influence of the generative organs is exerted equally upon the sexes, as well as, probably, throughout life. In animals exhibiting the phenomenon either of sexual dimorphism or seasonal armature or ornamentation, the generative organs, when the individual is young, have usually little or no influence on the body, which follows in its growth the simplest possible laws. As soon, however, as the generative organs commence to grow, their influence is usually very marked. Their increase—often sudden, and, one might almost say, violent—is effected at the expense of the other organs, which, as in the case of the muscles of the Salmon, are actually robbed of their material. The whole metabolism of the body is disturbed, and the nervous system is particularly affected. The pigment and material thus set loose is not necessarily transferred in its entirety to the genitalia, but may, as in the case of *Oncorhynchus*, find its way to the skin or elsewhere. I have suggested that in some such cases the condition of the animal is purely pathological. The heightened coloration is, as in the human jaundice, the mere outward manifestation of disease—a disease to which, in this case, the animal eventually succumbs. There must, however, be numerous cases where the animal, although sickening, survives. It is here that the power of Natural or Sexual Selection supervenes as a guiding influence on the manner and direction of the transference of pigment and matter. This matter, at first transferred haphazard, is guided into

channels which bring it to those parts of the body which are most in use in courtship, or chiefly subjected to nuptial energy. Hence may result many nuptial weapons or ornaments. Under such an argument we at once understand how it is that in some animals the sexual characters are permanent, in others transitory. Inasmuch as they follow the growth of the genital organs, where this growth is periodical so are they periodical, and, where the genital organs are influential throughout life, the characters are permanent, waxing and waning, however, like the Stag's horns, with their progress from youth through maturity to senescence. What is inherited, then, may well be not the secondary sexual characters themselves, but the influence of the genitalia, the tendency to the disruption of spare material and its deposition in particular regions, a process which certainly appears to become fixed after numerous generations.

Such is a view of sexual dimorphism and the seasonal assumption of nuptial weapons or ornaments, which I venture to put forward in all humility. Two advantages may be claimed for it—(1) it is based on a physiological standpoint, and starts on firmer and deeper ground than the older theories; (2) it includes in its scope not only persistent sexual dimorphism, but seasonal exhibitions of sexuality.

NOTES AND QUERIES.

MAMMALIA.

De Winton's Wood-Mouse in Worcestershire.—In the spring of this year I trapped a specimen of this Mouse in a conservatory in the parish of Norton, some three and a half miles outside Worcester, on the Pershore road. The specimen, a female with well-defined breast-band, gave in the flesh the following measurements in millimetres :—Head and body, 108; tail, 114; hind foot, 22; ear, 19. In Capt. Barrett-Hamilton's monograph of the Mice of the *Mus sylvaticus* type (Proc. Zool. Soc. 1900) this subspecies is recorded from the following counties in England :—Hereford, Sussex, Suffolk, Northampton, and Northumberland. Hence Worcester is a new county record.—R. I. Pocock (Brit. Museum, Nat. Hist.).

Autumnal Litter of Dormice.—On Sept. 29th I found a nest of *Muscardinus avellanarius* at Betton, near Shrewsbury, containing a doe and several young which were evidently newly born, as they were quite naked and blind. When the nest was visited seven days later it was found that the doe had disappeared, taking her young with her. On Aug. 28th last year I had brought me from the same place a nest with doe and young about half-grown, when the fur is brownish. As the Dormouse is said to litter in the spring, it seems that it frequently has two families in the year. I am informed that at the present time (early October) there are several other nests near here containing young.—H. E. FORREST (Shrewsbury).

White Leveret at Rainworth, Notts.—On Oct. 5th a man picked up a white Leveret (an albino), and brought it to me. We are trying to rear it by hand, and it looks bright and well so far, and will be a delightful pet, and a rare one if we succeed.—J. WHITAKER (Rainworth, Notts).

AVES.

Goldcrest Seven Hundred Miles from Land.—On Oct. 10th, when in lat. 56° 15' N. and long. 31° 13' W., a Goldcrest (*Regulus cristatus*) came on board the Allan Liner 'Tunisian.' It was raining and blowing a moderate S.S.W. gale at the time, and it sought shelter behind one

of the ship's skylights. It appeared in no way exhausted—in fact, it was as lively as if it was on land. After remaining fifteen minutes on board it rose to about eighty feet above the water, and disappeared in an easterly direction. The Golderest is the smallest bird in Great Britain, and it seems strange that it should be capable of such powers of flight, as the nearest land—Belmullet, Co. Mayo—was about seven hundred and twenty nautical miles distant, and only fifty-six miles short of half the distance across the Atlantic to Belle Isle. In this case the wind was not favourable to westerly migration, and the bird must have been engaged some time on its return journey. Cattle-ships afford food and a resting place to many migrants, more particularly those from America, in their attempts to cross the ocean, and if a record was kept of them it should prove to be both valuable and interesting.—J. TRUMBULL (Malahide, Co. Dublin).

Chiffchaff (*Phylloscopus rufus*) singing in Autumn.—With reference to Mr. A. H. Meiklejohn's note on this subject (*ante*, p. 388), I may mention that on the morning of Sept. 25th one was singing loudly in the garden here. I heard it first about 8 a.m., and saw it several times at close quarters, until it ceased singing about one o'clock. I had not before heard the Chiffchaff in this locality. On Aug. 31st, 1899, I heard one singing in a lime-tree at Wellingborough, and on Sept. 7th, 1900, I heard one singing in the gardens close to Belvoir Castle.—G. TOWNSEND (Polefield, Prestwich, near Manchester).

It is by no means an unusual occurrence to hear the Chiffchaff singing in the autumn months. On one occasion I heard an individual merrily chirping away in a small coppice so late as Oct. 9th. This I believe to be a record (at least for this district); but I have many times heard the note of this cheerful little warbler during the month of September.—W. H. WARNER (Fyfield, near Abingdon, Berks).

The song of the Chiffchaff in autumn, to which a correspondent calls attention (p. 388), is nothing unusual. I have frequently heard this bird singing in September, but the song at that season seems to lack the spirit with which it is uttered in the spring. Far more remarkable than the mere occurrence of the bird singing in the autumn is the fact that its song may then be heard in the most unexpected places. For instance, this last September I heard the song and saw the bird on several different days among some trees in Summerfield Park, within a stone's throw of one of the noisiest and most crowded streets of Birmingham; and I also heard it among some small trees in the grounds of Birmingham Workhouse Infirmary, where most trees will refuse to grow, on account of the smoke from adjacent factories.

I heard the Willow-Warbler last April in the same spot—a mere oasis in the desert of smoke-blackened houses. The Willow-Warbler also is well known to sing in the autumn, but here too the same remark holds good as in the case of the Chiffchaff, for the song is soft and subdued, and lacks the energy of the bird's spring notes. I have often, when listening to the Chiffchaff's song in the autumn, noticed it to sing, as it were, with a stammer, uttering a succession of hesitating cheeping notes. Sometimes it has seemed to me as though it were trying to sing like a Willow-Warbler, but after repeated attempts always came back to its own "cheep-cheep." These syllables more nearly represent the autumn notes, to my mind, than the words "chiff-chaff."—ALLAN ELLISON (17, Selwyn Road, Birmingham).

Richard's Pipit (*Anthus richardi*) in North Wales.—In connection with my work on the fauna of North Wales, I have recently had lent to me a MS. note-book kept by Dr. J. W. Moses, a medical man, who resided at St. Asaph from 1839 onwards. Amongst numerous local notes on natural history the following occurs :—"1840, Dec. 9th. Shot a lark upon the sandhills. I was attracted to the spot where it was feeding by the shrill, and to me strange, note it uttered. It measured from the point of the bill to the tip of the tail $7\frac{3}{4}$ inches, being nearly 2 inches longer than the Skylark. In plumage it resembled the Titlark. Whether this be a variety or no, I cannot say." This description appears to indicate that the doctor had got hold of Richard's Pipit, although the species has never been recorded in North Wales. It is unfortunate that the specimen is not, so far as I know, in existence; but the length of the bird, the shrill call-note, the Pipit-like colouring, and the very long hind claw can only apply to the species named. This note was submitted to Mr. Howard Saunders for his opinion, and he agrees with the diagnosis.—H. E. FORREST (Shrewsbury).

Siskins in Orkney.—On Sept. 21st several flocks of Siskins (*Chrysomitris spinus*) arrived on migration in the parish of St. Mary's, in the mainland of Orkney. The flocks numbered from fifteen to thirty individuals, and were feeding on the thistles along the cliff-edge. They were there, in decreasing numbers, for about three days, and then disappeared. The wind before their arrival and during their stay was southerly, and the weather foggy, particularly on the first morning they were observed. In 'A Fauna of the Orkney Islands' the Siskin is only admitted in brackets, the sole instance of its occurrence being a bird which was probably an "escape." Their arrival on migration therefore seems to be worth recording, though it may well be that as

more observations are made the bird will be found to occur there annually.—N. F. TICEHURST (Guy's Hospital, S.E.).

Siskins in Sussex.—This autumn seems to have been more marked by the appearance of small Finches, &c., than for many years past in this locality. On Sept. 14th I saw a Siskin (*Chrysomitris spinus*) on some brickfields near the West St. Leonards Railway Station. On the 16th I saw three large flocks of the same species, and from that time onward they seemed to increase in numbers, it being hardly possible to go out without seeing at least one large flock. It would be interesting to know if they have been observed in any number in other of our southern counties this year. The Redpoll (*Linota rufescens*) also arrived in some numbers, and unusually early. I saw the first on Sept. 19th, the usual time of their arrival here (St. Leonards) being the second week in October.—MICHAEL J. NICOLL (10, Charles Road, St. Leonards).

Breeding Habits of the Swift.—It may interest your correspondent, the Rev. Allan Ellison, to know that the number of eggs laid by the Swift was the subject of several letters in the 'Field' and 'Zoologist' as far back as 1867 (*cf.* Zool. 1867, pp. 915 and 990). Two correspondents, Messrs. Parnell and Marcus Richardson, related instances in which they had found three eggs. On the other hand, Mr. Sterland had never found more than two; and the editor quotes his 'Dictionary of British Birds' and 'Birdsnesting' to the effect that "the eggs of the Swift are two in number." The numerous instances in which three eggs have been found without any reasonable probability that they were the produce of two hens seem, however, to prove that the normal number of eggs varies from two to three, and I believe that occasionally four eggs are laid. If it were a common occurrence for two hens to lay together, surely clutches of four would be numerous instead of being exceedingly rare. — FRANCIS C. R. JOURDAIN (Clifton Vicarage, Ashburne, Derbyshire).

Hobby Breeding in Shropshire.—It is pleasant to record that the pair of Hobbies (*Falco subbuteo*) mentioned in this Journal twice before (Zool. 1900, pp. 143 and 382) returned again to breed in the same nest for the third time this year. Mr. J. Palmer, Mr. J. Steele Elliott, and I visited the nest on June 27th, when there were, as usual, three eggs in it. A young Hobby with traces of down on the neck was shot near Bridgnorth about Sept. 10th, probably one of the same brood.—H. E. FORREST (Shrewsbury).

Red-footed Falcon in Essex.—On Oct. 17th, Mr. Cole, of Norwich, received for preservation, for the Rev. J. R. Owen, an immature male

Red-footed Hobby (*Falco vespertinus*), which that gentleman informs me was shot in Essex, at Bradwell-on-the-Sea, where, he adds, interesting birds are often seen, as the parish consists of a promontory which runs out into the sea. It has a white throat, and a tint of ruddy brown on the upper surface and on the breast; tail-feathers barred; legs, toes, and claws orange. *F. vespertinus* is a species not included in Miller Christy's 'Birds of Essex.'—J. H. GURNEY (Keswick Hall, Norwich).

Osprey at Rye Harbour.—On Sept. 13th, whilst at the mouth of Rye Harbour, Sussex, I noticed a large bird sailing over the sea from the south-east, which on its nearing the shore I easily identified as *Pandion haliaëtus*. The tide was high at the time, and, not in the least disconcerted by the presence of several people, the bird commenced fishing for Grey Mullet. It hovered in the air like a Kestrel, and then with nearly closed wings hurled itself into the sea, almost disappearing below the surface. Its last plunge was within about one hundred and fifty yards of where I sat, and, as far as I could judge with glasses, it made use of its bill as well as claws to secure the fish, and rose with a large Mullet, which it carried parallel with its body (*i. e.* the fish's head pointing towards its head). It flew straight out over the sea in a due southerly direction.—MICHAEL J. NICOLL (10, Charles Road, St. Leonards).

Osprey in Hampshire.—During the latter half of September I had heard of one or more large Hawks having been occasionally seen flying high over the river, and from description I supposed it was an Osprey (*Pandion haliaëtus*), as in previous autumns I had seen the species more than once in a similar situation. My supposition was confirmed, for on Oct. 4th an Osprey was sent me for identification from the neighbourhood of Fordingbridge. It was in very fair plumage, but in emaciated condition, as if starved, and had nothing whatever in its stomach, although it turned the scale at 3 lb. 12 oz., and was 4 ft. 8 in. from tip to tip of expanded wings. Sex female, but very immature. The plumage was swarming with a small brown parasite—*Acarus*, I believe—which must have been highly annoying to the poor bird; but is it not the case that these tiny pests increase more rapidly upon a weakly victim than they do with a strong and healthy subject? In 'The Birds of Wiltshire' the Rev. A. C. Smith records the occurrence of two Ospreys in Wilton Park on Oct. 14th, 1882; so that its occurrence so far up the Avon as Fordingbridge needs no comment, since the bird is not very rare in Christchurch Bay, which in a direct line is no great distance for such powerful wings to traverse; and it has more

than once been recorded as visiting Fleet Pond, in quite another part of the county. What a study is the short plated leg, file-like toes, and long and powerful claws, &c., belonging to this bird—all so nicely adapted to secure and retain its slippery and finny prey; whilst the very short thigh-feathers, so unusual in the Falcons, at once attract attention.—G. B. CORBIN (Ringwood, Hants).

Little Bustard in Sussex.—On Dec. 23rd, 1900, a Little Bustard (*Otis tetrax*) was shot at Kitchenham Farm, Ashburnham, near Hastings, Sussex, by the Hon. John Ashburnham. Mr. Borrer, in his 'Birds of Sussex,' describes it as a very rare straggler. He only mentions four instances of its occurrence, the two last in 1879.—GEORGE W. BRADSHAW (54, London Road, Reading).

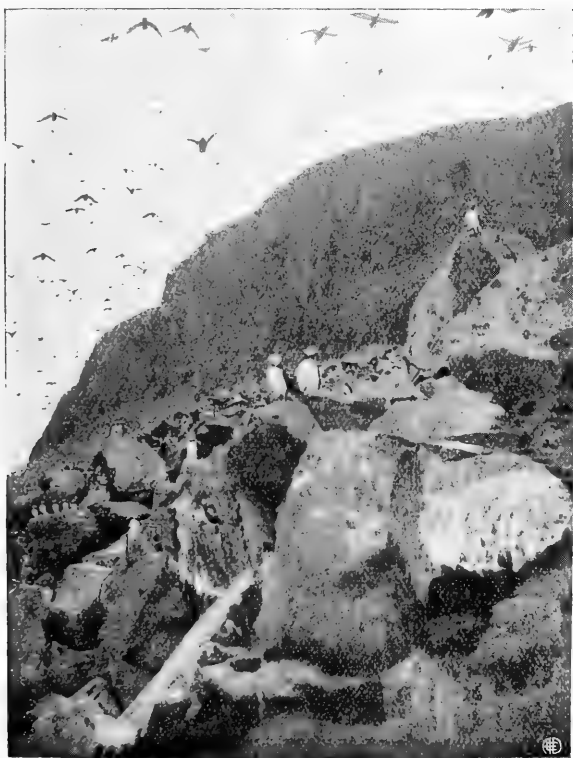
Red-necked Phalarope (*Phalaropus hyperboreus*) in North Wales. On Sept. 27th I was shown, at a local taxidermist's, a Red-necked Phalarope, which had been found a day or two before at Towyn. Mr. Howard Saunders happened to be in Shrewsbury that day, and kindly examined the specimen. The toes being only slightly lobed, he judged it to be rather a young bird. It was in autumnal plumage, with no trace of red. With the exception of a specimen shot in Anglesey (Zool. 1893, p. 428) this seems to be the only example ever recorded on the west side of North Wales.—H. E. FORREST (Shrewsbury).

Great Snipe and Variety of Swallow in Hampshire.—On Oct. 12th a specimen of the Great or Solitary Snipe (*Gallinago major*) was shot in this neighbourhood, but, having been killed with "duck-shot," it was very much mutilated, part of the tail having been carried away, and the dark barred under parts of the body were very torn. It weighed exactly 8 oz., and under the broken skin appeared to be a mass of oily fat. The whole plumage was much darker than the Common Snipe, the length of beaks being about equal; but in the larger species the legs were of a greener hue, and much more robust, and from the toes to the first joint measured three-eighths of an inch more than in the commoner bird. The outer tail-feathers were not wholly white, but had indications of dark bars across their entire width, an indication, as described, of immaturity.

Several times in the summer I was told that a so-called "white Swallow" (*Hirundo rustica*) had been seen about the river here, and I trust its life was spared; but at the end of August the remains of a peculiar variety of this summer-loving bird was sent to me from the neighbourhood of Lymington. It appeared to be a uniform pink chocolate brown upon the back and greater wing-coverts, the head and breast being a lighter grey; the larger quills both of wings and

tail having much paler edges, the "spots" in the tail almost white, throat and forehead of the usual chestnut-brown, but pale, and apparently blending into the colours near it. From measurement of wing, &c., it seemed to have been mature, but altogether it was so shattered that nothing very reliable could be ascertained. I may here remark that Swallows were comparatively scarce last summer, and the Martin and Sand-Martin were not seen in their usual numbers; but the Swift was more abundant than I have seen it for many years, and stragglers were here several days before their usual time, about May 1st.—G. B. CORBIN (Ringwood, Hants).

A Breeding Station of the Puffin (*Fratercula arctica*).—It would be well worth while for any person sailing up the Little Minch to spend a



PUFFINS ON THE SHIANT ISLANDS.

few hours on the Shiant Islands, if tide and wind permit. The Shiant Islands, as most people know, are a small group of islands lying

between Lough Ewe on the mainland, and Lough Seaforth in the Outer Hebrides. The larger of the two islands is divided nearly equally into two heights, connected in the centre by a bank of coarse gravel and large rounded boulders. On a recent visit we climbed the northern mound, which is fairly steep, reaching a height of 528 ft., the only side that one can ascend, being covered with short slippery grass, which renders it somewhat dangerous. We saw thousands of Puffins flying backwards and forwards from the face of the cliffs and rocks below, where they would settle for a few minutes, then fly away again for another cruise round and round the cliff. It did not appear to be fright that made them fly, but a love of exercise, as I approached within a few yards of various groups of them with my camera, when they did not seem alarmed, but sat looking at me with a ludicrous stolid gaze, their large beaks appearing to interfere with their sight, as they nearly always turned one side of their heads to look at me. When close to the top of the hill we came on their nesting-places, which were just like rabbit-burrows, but not so deep; there were Puffins in some of them, but we saw no eggs or very young birds, the month of July being rather late, as they are said to lay their eggs in May. They bite fiercely, and I remember seeing one of our sailors getting his finger badly cut by one that he caught hold of. There seemed to be a scarcity of other birds in these islands; we saw a few Guillemots and Gulls swimming about, but the Puffins were everywhere in the majority. The inhabitants were pleasant clean-looking people who could not speak a word of English, and consisted of an old man, some women, and children, the younger men being all away at the fishing. We obtained some Puffins' and Guillemots' eggs for a few pence each from these people. The Guillemots appear to breed in the more inaccessible parts of the island. — W. H. WORKMAN (Lismore, Windsor, Belfast).

REPTILIA.

Sand-Lizard in Berkshire.—In answer to your correspondent (*ante*, p. 392), a Sand-Lizard (*Lacerta agilis*) I gave to the London Zoological Gardens (*vide* List Vert. Animals, 9th edit. 1896, p. 594) on June 25th, 1886, was caught in the neighbourhood of Wellington College, Berkshire. — S. S. FLOWER (Director, Government Zoological Gardens, Ghizeh, Egypt).

INSECTA.

A Dipterous Parasite in the Plumage of Birds.—I was much interested in the notes referring to this subject (*ante*, p. 357). In my younger entomological days I sent a note of a somewhat similar kind

to the 'Entomologist' (1874, p. 137), and our ever kind old friend, the late Edward Newman, had no hesitation in naming the parasite *Ornithomyia avicularia*, as Mr. Austen has done, and who has kindly added the interesting note on the metamorphosis of the fly. My limited experience, however, does not exactly coincide with the remark that this species "appears to occur indiscriminately in the plumage of most wild birds." I have seen it in the plumage of several of the birds in the list following the above quotation, as Blackbird, Song-Thrush, Green Woodpecker—and I may name the Jay—but in very isolated cases; whilst, on the other hand, the Long-eared Owl is seldom obtained without some specimens of the fly being present. I have never seen it upon any other Owls, and had ignorantly supposed it was almost confined to *Asio otus*. Its short flights and peculiar manner of progression, especially amongst the soft loose plumage of the bird in question, is sure to strike the observer when once seen, and it is very interesting to know something of its highly remarkable life-history. I should also like to know if other observers have noticed its partiality for the Owl, or is it a local peculiarity? I can safely say I have seen scores upon the plumage of this particular bird, but I have detected but few upon any other species; and I formerly secured this and other bird-parasites for the microscopical work of my friend the late Rev. H. G. W. Aubrey.—G. B. CORBIN (Ringwood, Hants).

NOTICES OF NEW BOOKS.

A Treatise on Zoology. Edited by E. RAY LANKESTER, M.A., LL.D., F.R.S., &c. Part IV. The Platyhelminia, Mesozoa, and Nemertini, by W. BLAXLAND BENHAM, D.Sc., M.A. Adam & Charles Black.

ALL serious students of zoology—to whom this publication is addressed—will welcome the appearance of another volume of this excellent treatise. The present contribution is written by Dr. Benham, and was mostly completed before the author left England to take up his appointment in the University of Otago, New Zealand. The Platyhelminia represent a natural phylum often submerged by writers under the old and more inexact term “Vermes,” and comprise Flatworms (Planarians), with their offshoots, the Flukes and the Tapeworms. A method pursued, as in the previous parts—already noticed in these pages—and again one of the original features, is an historical survey of each class, showing the slow and gradual accumulation of the facts and theories dealt with, and the chief zoologists who have contributed to our knowledge of the group. One of the most interesting questions raised in the volume relates to the Tapeworm, and as to how the life-cycle of these animals, now perfectly understood, conforms to, or illustrates Steenstrup’s *Theory of the Alternation of Generations*. This is very fully discussed, and demands the careful study of those interested in the question.

It is still apparently too often forgotten that it is in such books as the one under notice, and in studies such as it enforces, that the true facts of evolution are to be found, and not by surface impressions or ingenious suggestions. Nothing seems so much in vogue as an acquiescence in the dogmas of a popular evolution designed for the instruction of the man in the street, or for those who like to acquire new ideas on trust. It is, however, probably as true as the facts of evolution itself, that in every civilized country the number of those who have acquired

the knowledge to master the conception is not very large. These, however, are its high priests, and it would be well if the doctrine always came from them direct. Evolution is a revelation, but it is only made to those who diligently seek it, and the study of this Treatise on Zoology will greatly help those who care to make the quest.

Use-Inheritance, illustrated by the direction of Hair on the Bodies of Animals. By WALTER KIDD, M.D., F.Z.S. Adam & Charles Black.

THE aim of this brochure is clearly stated in the Preface—"The facts dealt with in the following pages are intended to show that the doctrine of the non-inheritance of acquired characters does not always hold good." To prove this negative is somewhat difficult; to even suggest it is to-day unpopular to those who believe *en masse*, and receive *ex cathedra*. As the author states—"All the various forms of mutilation of animals and man practised from time immemorial have failed hitherto to furnish cases of such mutilations being transmitted by descent." Mr. Kidd does not, however, suggest that such constant mutilations may have caused congenital variation which has become hereditary.*

The author proposes a dynamical explanation for the presence of whorls, featherings, and crests in the hairy coats of mammals, and argues that, as a rule, they are due to the traction of the underlying muscles of the part in question, occurring in regions where opposing traction of underlying muscles is found; never occurring over the middle of a large muscle, and most uniform and strongly marked in animals with very strong muscles.

In considering the hair-slope in man, Mr. Kidd makes a distinct challenge to the followers of Weismann, which we only propose to record. It appears that, although the arrangement of hair in man corresponds to a considerable extent with that of the Anthropoid Apes, there are certain peculiarities, or an "exceptional type," in its distribution which raise the issue whether "the hair-slope in man is a strong argument against the theory of the Simian descent of Man (as far as present evidence goes),

* Thus circumcision may have had a reflex action on facial characters.

or that it furnishes a body of evidence against his (Weismann's) cardinal rule that acquired characters are never inherited."

Biometrika: a Journal for the Statistical Study of Biological Problems. Part I. Cambridge: at the University Press.

THIS is a proposed quarterly publication, and is edited, in consultation with Francis Galton, by W. F. R. Weldon, Karl Pearson, and C. B. Davenport. It is an expression of the advanced study of evolution, and a recognition of the mathematical argument that may be employed in its exposition. "It is intended that 'Biometrika' shall serve as a means not only of collecting under one title biological data of a kind not systematically collected or published in any other periodical, but also of spreading a knowledge of such statistical theory as may be requisite for their scientific treatment." On these grounds alone this new publication will be welcomed; but it possesses a still higher credential, as expressed in its editorial preface, which we must quote in full:—"Evolution must depend upon substantial changes in considerable numbers, and its theory therefore belongs to that class of phenomena which statisticians have grown accustomed to refer to as *mass-phenomena*. A single individual may have a variation which fits it to survive, but unless that variation appears in many individuals, or unless that individual increases and multiplies without loss of the useful variation up to comparatively great numbers—shortly, until the fit type of life becomes a mass-phenomena—it cannot be an effective factor in evolution." Hence the cogency and value of the study by mathematics of large numbers. The value of this method applied to the many guesses, theories, and suggestions which the term evolution has inspired, but for which real evolutionary study is not answerable, cannot be ignored. It can be expressed in the words of Darwin: "I have no faith in anything short of actual measurement and the Rule of Three."

To many like ourselves, to whom abstruse figures are repellant, and all machinery abhorrent—and there is a fear that we are a large number—we shall scarcely follow the process, though we cannot neglect the conclusions. It will be well for all to

sometimes turn from Philip the theorist to Philip the mathematician. Figures will doubtless show the bankruptcy of much apparently joint-stock theory, and we may indeed rejoice in the prospect of such a result.

General Report on the Investigations in Porto Rico of the U.S. Fish Comm. Steamer 'Fish Hawk' in 1899. By BARTON WARREN EVERMANN. Washington: Govt. Printing Office.

THE acquisition of Porto Rico by the United States has been already followed by scientific results of the greatest interest to zoologists, and we may confidently expect the same biological enterprise to be devoted to the study of the Cuban fauna. The present volume is devoted to the fishes of Porto Rico, of which 291 species are now enumerated. Of these no fewer than 263 were obtained by the 'Fish Hawk' expedition, and thirty-three of them proved to be new species. All the genera and species are fully described, and very many figured; while forty-nine coloured plates are added, which alone are a revelation to those who have never seen the gorgeous hues of, say, the fishes of a coral-reef. These figures may be accepted as true in colouration, for most of them "were painted on board the 'Fish Hawk,' the fish being placed in an aquarium as soon as caught, and the life colors gotten before they had undergone any appreciable change." This, of course, is not possible in all cases, and an almost insurmountable difficulty is experienced, as when, in the case of the Deep-water Gurnard (*Peristedion gracile*) we are told:—"So rapidly do such fishes as this change color when brought up from considerable depths, that we can never be sure that the colors they exhibit when we first behold them are really those which they possess in the depths which they inhabit; in fact, we may be quite sure that the colors are not the same, but whether the colors are more or less intense is difficult to determine."

The curious trivial names applied to animals are often inexplicable. A fish found from Florida Keys to Brazil is known by the appellation of "Margate-fish." According to Mr. Evermann, some of the fishermen of the Bahamas came originally from Margate, and thus gave the name of their English port to a fish which they found in the Bahamas.

Catalogue of the Arctiadae (Arctianæ) and Agaristidae in the Collection of the British Museum. By Sir GEORGE F. HAMPSON, Bart. Published by the Trustees of the British Museum.

THIS forms volume iii. of the great monographic Catalogue of the Lepidoptera Phalænæ, and is something more than its title implies, being not confined altogether to the species contained in the National Collection, but embracing all others known and recorded. The present volume is a bulky one, containing 690 pages, and the descriptions of 1171 species, with synoptical keys to, as well as descriptions of, genera and species. It completes the *Arctiadae*, and also fully deals with the small family *Agaristidae* of day-flying habits. To produce such volumes annually is no small task, and the author may be congratulated on maintaining his standard of thoroughness throughout.

There can be little doubt that a standard of nomenclature must for long appertain to these volumes. The examination and comparison of genera and species has been so extensive as to command respect, even from those whose descriptions have been treated as of a synonymical character only, the author having shown a healthy spirit of conservatism in classificatory details, and having written with the courage of his convictions.

A fresh departure seems to have been taken in the spelling of some generic and specific names, to which publicity should be given, as the course will probably occasion considerable comment. We find "valkeri" substituted for "walkeri," "vestwoodi" for "westwoodi," and other similar changes. This is a scholastic question which will probably result in divergent opinion, and need not be discussed here.

We certainly feel a spirit of gratitude as we peruse these pages of condensation and analysis; they make the study of a difficult subject a matter of surmountability, and render the classification and recognition of a large concourse of living creatures an easy undertaking for any serious student. Besides the numerous illustrations incorporated in the text, nineteen beautifully coloured plates are given in a separate form.

Fauna, Flora, and Geology of the Clyde Area. Edited by G. F. SCOTT ELLIOT, MALCOLM LAURIE, and J. BARCLAY MURDOCH. Glasgow: Published by Local Comm. Brit. Association.

THE inception of this volume is due to the recent meeting of the British Association at Glasgow. Twenty-five years ago, when the Association met on the banks of the Clyde, a Natural History Handbook was issued to the members, but the present volume is a notable advance on that publication. The lists have now been compiled by a large body of workers, amongst whom are many well-known names, and will be invaluable to zoologists and geologists, who so frequently visit this beautiful area. The volume also ought to, and probably will, prove an incentive to local collectors, and we may expect to find records of species "not included in the Brit. Assoc. List." This will probably prove a laborious quest, for many of the lists are compiled by men difficult to beat in this undertaking; but the last word is never said in a local list of species distributed over such a country as the Clyde Area. A splendid Bathy-orographical Map accompanies the volume.

How to know the Indian Ducks. By F. FINN, B.A., &c. Calcutta: Thacker, Spink & Co.

THE Indian Ducks treated in this small but handy publication "include all Teal, Geese, Swans, and Mergansers." In reading the title therefore we must make a somewhat free use of the imagination. Besides a description of each species, and an account of its distribution, there are many observations of an interesting character. Indian vernacular names are given, and in an appendix we find many hints as to the successful treatment of these birds in confinement. Although this advice is given for the domestication of these "Ducks" in India, the small publication is well worth the perusal of all aviculturists in this country.

EDITORIAL GLEANINGS.

IN the 'Quarterly Journal of Microscopical Science,' Dr. W. G. Ridewood has published a most valuable paper "On the Structure of the Hairs of *Mylodon listai*, and other South American Edentata." We are glad to see that Dr. Ridewood is dissatisfied with the present composition of the order Edentata, which, as he remarks, will probably prove to be an unnatural assemblage of animals, and that, acting on further knowledge, it will probably prove necessary to remove the Old World forms *Manis* and *Orycteropus* to constitute two new orders by themselves. The diagnoses of hair-structure given in this communication are of too technical a nature for reproduction in our pages; but the publication has prompted a paper by Mr. R. Lydekker in 'Knowledge' on "Plant-bearing Hair," of which we cannot do better than give the following abstract:—

The author remarks that, "apart from its extremely coarse and brittle nature, the most striking peculiarity of the outer hair of the Sloths is its more or less decidedly green tinge. . . . Now green is a very rare colour among mammals, and there ought therefore to be some special reason for its development in the Sloths. And, as a matter of fact, the means by which this coloration is produced is one of the most marvellous phenomena in the whole animal kingdom—so marvellous, indeed, that it is at first almost impossible to believe that it is true. The object of this peculiar type of coloration is, of course, to assimilate the animal to its leafy surroundings, and thus to render it as inconspicuous as possible; and, when hanging in its usual position from the under side of a bough, its long, coarse, and green-tinged hair is stated to render the Sloth almost indistinguishable from the bunches of grey-green lichens among which it dwells. In the outer sheath of the hairs of the *aï* there are a number of transverse cracks, and in these cracks grows a primitive type of plant, namely, a one-celled alga. In the moist tropical forests forming the home of the Sloths the algæ in the cracks of their hair grow readily, and thus communicate to the entire coat that general green tint which, as already said, is reported to render them almost indistinguishable from the clusters of lichen among which they hang suspended."

Mr. Lydekker adds some weighty remarks in his paper. "It is quite clear that an alga would have been of no advantage to the Sloths

until they had acquired their present completely arboreal kind of life, and, since there is a considerable probability that both types of these animals were independently derived from some of the smaller Ground-Sloths, it follows that on two separate occasions an alga has independently taken advantage of this suitable vacant situation, and adapted itself to its new surroundings. This difficulty, like the one connected with Sloths, having flourished before they acquired a lichen-growth, may appear of little importance to those who are convinced of the all-sufficiency of natural selection, but to others it may (if well-founded) seem more serious."

IN the *Proceedings of the Asiatic Society of Bengal* (August, 1901), Miss Nelly Evans has contributed "Some Observations on the Life-History of *Culex fatigans*, the Common Grey Mosquito of Lower Bengal." The paper gives detailed evidence with regard to the female of this species of Mosquito—(1) that it may live, in its adult or imago stage, for nearly five weeks; (2) that during its adult life it may feed as many as five times; and (3) that it does not feed indiscriminately, but has a preference for the blood of the House-Sparrow, refusing that of Java-Sparrows, Larks, Rails, and White Rats. All these facts, but the last one in particular, are considered to favour the possibility of the insect being a carrier of a definite blood-infection, and to support the conclusions of Ross based upon experiments with this species of Mosquito.

WE learn from Melbourne that it has been decided to form an "Australasian Ornithologists' Union." The objects of the Society are the advancement and popularization of the science of ornithology, the protection of useful and ornamental avifauna, and the editing and publication of a magazine or periodical to be called *The Emu*, or such magazine or periodical as the Society may from time to time determine upon. The President-Elect is Col. W. V. Legge, R.A., F.Z.S., &c., and the Hon. Secretary, D. le Souëf, C.M.Z.S., M.B.O.U., &c.

We have now received Part I. of *The Emu*, a publication which will prove a very important factor in a knowledge of Australasian ornithology. It is well illustrated, and among its contributors are many well-known names.

IN Mr. John Morley's panegyric on Gladstone, at the recent unveiling of that deceased statesman's statue at Manchester, is an interesting statement of the mental platforms of Gladstone and Darwin.

Mr. Morley, after describing the many mental gifts and activities of his master, went on to remark :—" No doubt something was left out in the wide circle of his interests. Natural science, in all its speculations and extensions and increase of scientific truth, extension of scientific methods—all that, no doubt, constitute the central activities, the intellectual activities, of England and Europe during the last forty years of his life—to all that he was not entirely opened. I remember once going with him one Sunday afternoon to pay a visit to Mr. Darwin. It was in the seventies. As I came away, I felt that no impression had reached him; that that intellectual, modest, single-minded, low-browed lover of truth—that searcher of the secrets of nature—had made no impression on Mr. Gladstone's mind, that he had seen one who, from his Kentish hill-top, was shaking the world."

MR. W. EAGLE CLARK, writing in the *Auk* (October last) states that the occurrence of a third example of the so-called Mealy Redpoll in the Island of Barra, one of the Outer Hebrides, incited him to procure the specimens, with a view to ascertaining to what species or subspecies of *Acanthis* the birds obtained in this far western island belonged. He found that all three examples were referable to the form described by Dr. Stejneger as *Acanthis linaria rostrata* (Coues)—a bird not hitherto recorded for Great Britain, though several specimens have been obtained on islands off the west coast of Ireland.

IN the *American Naturalist* for October last, Prof. W. M. Wheeler has concluded his series of papers on "The Compound and Mixed Nests of American Ants." The author has arrived at the same conclusion as Wasmann, that there are no evidences of ratiocination in Ants. Prof. Wheeler, however, remarks that this conclusion, "even if it be extended so as to exclude all animals except Man from a participation in this faculty, does not imply the admission of a qualitative difference between the human and animal psyche, as understood by Wasmann. Surely the sciences of comparative physiology, anatomy, and embryology, not to mention palæontology, distribution, and taxonomy, must have been cultivated to little purpose during the nineteenth century if we are to rest satisfied with the scholastic definition of ratiocination as an adequate and final verity. And surely no one who is conversant with modern biological science will accept the view that the power of abstract, ratiocinative thought, which is absent in infants and young children, scarcely developed in savages, and highly developed and generally manifested only in the minority of civilized man, has miraculously sprung into existence in full panoply like the daughter of Jove."



BLAAUWBOK BULL (*HIPPOTRAGUS LEUCOPHÆUS*) IN THE LEYDEN MUSEUM.

THE ZOOLOGIST

No. 726.—December, 1901.

THE BLAAUWBOK (*HIPPOTRAGUS LEUCOPHÆUS*).

By GRAHAM RENSHAW, M.B.

(PLATE III.)

THE astonishing fecundity of many animals has for long years been a subject of interest to the zoologist, though unfortunately too often a curse to the colonist and to the farmer. The species possessing this marvellous vitality flourish even under the most adverse circumstances, in spite of the attacks of countless enemies, even when man himself is added to the list of destroyers—such species as the White Cabbage Butterflies amongst insects, the Herring amongst fishes, the House-Sparrow amongst birds, and Rats and Rabbits amongst the Mammalia.

On the other hand, to-day we deplore the loss of many fine animals, some of which have perished from unknown causes, or from natural changes in their environment; the remainder, alas! have been directly harried out of existence by man, either for food—for the sake of the paltry commercial value of their skins or carcasses—or (still less excusably) in sheer wasteful wanton destruction, the hunters killing for killing's sake. How far these mournful results might have been avoided it is impossible now to say, but the facts remain. Never again will the gigantic Moa (*Dinornis* sp.) wander through the ferny solitudes of

New Zealand, its towering Ostrich-like head carried twelve feet high as it strides with ponderous gait over the limestone slopes; never again will the Dodo (*Didus ineptus*), rotund and ungainly, waddle through the forest glades of Mauritius; and never again will the surf-beaten rocks of Geirfuglaskér resound with the clamour of swarming multitudes of Great Auks swimming and diving in the foam, or sitting in line on the slippery ledges like regiments of gigantic Razorbills. Steller's Sea-Cow (*Rhytina gigas*) no longer blackens the shallows round Behring's Island, lazily browsing on the laminaria; the true Quagga (*Equus quagga*) no longer gallops over the spreading veldt in close-packed masses, accompanied by herds of lumbering Wildebeeste; and the American Bison, once monarch of the prairies, now finds a tardy refuge from extermination in the parks and zoological gardens of civilized man.

It has long been noticed that the first species to disappear are those of large size and limited range, being more conspicuous, and also relatively fewer in individuals than smaller and cosmopolitan forms. Thus the great Copper Butterfly (*Chrysophanus dispar*), once abundant in our own fenland (but in its typical form known nowhere else), has been extinct since 1860; the Solitaire of Rodriguez might still have existed had it not been a gigantic Pigeon good to eat and unable to fly; and the more than decimated White Rhinoceros might have been better represented than by a few survivors in Mashonaland and the Zululand preserves had it possessed the diminutive proportions and inhabited the mountain fastnesses of the Cape Hyrax.

Amongst the vanished Mammalia was a beautiful Antelope—the Blaauwbok (*Hippotragus leucophæus*)—formerly inhabiting the province of Swellendam, in Cape Colony, but since 1800 at latest utterly extinct. So early was this fine animal exterminated, and so rare are its remains in museums to-day, the most recent being of necessity over a century old, that but very little is known about it; and for every zoologist who has heard of the Blaauwbok, there are probably five hundred who have heard of the Great Auk and the Norfolk Island Parrot. The Blaauwbok stood about 40 or 45 in. high at the withers, as far as can now be ascertained; it carried a handsome pair of curved horns adorned with well-marked annulations, and terminating in sharp

points; it was bluish grey above (the coat showing a beautiful velvety appearance during life), and snow-white beneath, there being no marked demarcation between the colours: indeed, Le Vaillant says that when seen from a distance the living animal appeared to be entirely white. The Blaauwbok derived its specific name *leucophæa* from a whitish spot just in front of and beneath the eye; the anterior surfaces of the limbs were darker than the posterior. The ears were rather long; the neck bore a very short mane, reversed like that of an Oryx Antelope.

An alleged change of colour in the skin of the Blaauwbok after death has given rise to some comment. Pennant, in his 'History of Quadrupeds,' says:—"Colour, when alive, a fine blue of a velvet appearance; when dead changes to bluish grey with a mixture of white." Dr. Sparrman, who travelled in South Africa during 1772-1776, in mentioning the Blaauwbok, observes: "On this subject the reader may likewise turn to Mr. Pennant's Blue Antelope"; and also says: "The colour of this creature when alive is said to resemble that of blue velvet, but when it is dead it is of a leaden colour." Le Vaillant, who obtained a Blaauwbok bull in December, 1781, states that the colour of the animal was faint blue inclining to grey, with snow-white belly, the head being above all beautifully spotted with white; but, he adds ('Travels in Africa,' vol. i. p. 132), "I did not observe, as Dr. Sparrman says, that this Antelope when alive resembles blue velvet, and that when dead the skin changes its colour; living or dead it appeared to me always alike. The tints of that which I brought with me never varied."

At first sight it would thus seem that the statement of Le Vaillant contradicts that of Sparrman, and also indirectly that of Pennant; but we must remember that in some Antelopes, such as Eland and Kudu, the hair becomes so scanty that the bluish hide shows beneath it in old age; and this hide, after *post-mortem* drying, becomes black or "leaden colour." Further, this change due to drying is actually recorded by Sir Cornwallis Harris as taking place in the Roan Antelope, the nearest living ally of the Blaauwbok, and we may therefore well assume that Le Vaillant expected to see some conspicuous change in the *hairy covering* itself due to chemical or other causes, such as has

been observed to take place in the lilac breast-feathers of the newly-dead Gouldian Finch (*Poephila gouldiæ*). If the first two or three Blaauwbok obtained were infirm old bulls, easily dispatched by the uncertain and primitive weapons of the old days, we can reasonably infer that the hide, denuded through age of most of the original hairy covering, would appear conspicuously bluish during life, and conspicuously black after *post-mortem* drying, and thus originate the colour-change legend.

We can in these latter times form only a *general* idea of the habits of the Blaauwbok with the slender aid of analogy and our knowledge of allied species. Field notes of the habits of *Hippotragus leucophæus* will, alas! never be forthcoming, for it was hardly known even to the early colonists, and in those days there was no enthusiastic photographer with telephotic lens and screened camera to obtain sun-picture records for future generations of naturalists to debate over. Nevertheless, as the palæontologist reconstructs for us the ancient world till with vivid imagination we see again the rivers of Britain alive with bellowing Hippopotami, or watch the Pterodactyl skimming with extended parachute through the waving groves of pterophyllum, so also with the aid of analogical reasoning we may form an idea of the daily life of the Blaauwbok.

The nearest living allies are the Roan Antelope (*H. equinus*), a noble beast of sturdy appearance and imposing stature; and the yet more glorious Sable Antelope (*H. niger*), jet-black above, snow-white beneath, its head armed with magnificent horns sweeping backwards in a scimitar-like curve. Le Vaillant compares a Blaauwbok which he saw at a distance to a white Horse; and, taking everything into consideration, we may reasonably conclude that this vanished Antelope was a beautiful and stately creature, with its handsome blue-grey coat and snowy under surface well set off by the graceful sweep of the elegant though moderate-sized horns. The blue-grey colour need not have been disadvantageous to it, for travellers have assured us that the boldly coloured Roan and Sable Antelopes, in spite of their great size, are often quite invisible in the broken lights and shadows of thick bush; and especially at night the neutral greyish tint was well adapted to protect the Blaauwbok, just as our own warships painted grey become practically invisible in the gloom of night.

The brief history of the Blaauwbok is a miserable record of speedy extermination. The actual date of its discovery will probably never be known. Kolben, who visited the Cape between 1700 and 1710, mentions the "Blue Goat"; but the species was first definitely described by Pallas, who examined, in 1766, a specimen preserved at Leyden—the first one known to have been brought to Europe. From the little that is recorded of the animal, it appears to have been nowhere abundant. Le Vaillant gives as a locality, "the valley of Soete Melk, the only canton which they inhabit," and subsequently Lichtenstein mentions the mountains near the Buffalo-jagt River, between Swellendam and Algoa Bay, as one of the last refuges of the Blaauwbok. Le Vaillant obtained his specimen (a bull) in 1781; already it had become "*the most scarce and beautiful species of the African Gazells.*" Sir John Barrow, whose work on South Africa was published in 1801, remarks that in his day the Blaauwbok was almost exterminated; while Lichtenstein says that "some" were shot in 1800, but that since then no more had been seen. These Blaauwbok of 1800 were, in fact, the last of their race.

Nevertheless, the *post-mortem* existence upon which the species has entered has proved almost as lively as that which it enjoyed in the flesh; for as the years passed by, and no new examples were obtained, naturalists began to inquire for it with a zeal similar to that which animated the would-be discoverers of the living Moa in New Zealand, and, more recently, the searchers after the Ground-Sloth (*Myodon listai*) in Patagonia. Sir Andrew Smith, in 1835, searched for it in vain; he also says that, after studying a carefully executed drawing of the Blaauwbok in the Paris Museum, he concluded that the sketch represented merely a young Roan Antelope. His friend Sir Cornwallis Harris, who, during 1836-7, enthusiastically shot specimens of every kind of South African game animal for his collection, inquired persistently for the Blaauwbok without success. "For the last forty years," writes Harris, "not an individual has been heard of in Southern Africa"; and he adds: "For a *leucophæa* I would willingly have given a finger of my right hand." Finally, many zoologists boldly declared the Blaauwbok to have been a zoological myth, asserting that the few specimens still existing were merely small or young Roan

Antelopes. The matter, however, was rightly settled in favour of the Blaauwbok as a true species. The measurements of several existing specimens were found to coincide; Sundevall, who examined a long series of Roan Antelope of all ages and both sexes, pointed out that the feet of the Stockholm *leucophæa* were smaller than those of even quite young *equina*; and a long list of differences between the two species has been drawn up. I have myself repeatedly examined the Leyden specimen, which plainly shows that the Blaauwbok was distinguishable by the following characters:—

1. Horns relatively longer than in the Roan Antelope.
2. Ears relatively shorter, and not pencilled at the tips.
3. Mane directed forwards.
4. Throat-hairs short.
5. No anteocular switches of hair.
6. No black on face.

Compare this with the short stout horns, immense ears, hogged mane, ruffed throat, anteocular brushes, and magpie face of the Roan. The fine bull Blaauwbok in my photograph is surely distinct enough from any of the allied species; for, if merely a small though *adult* Roan, why is there no black on the face; if *immature*, why does it carry such fine curved horns?

There is another point, not hitherto, I think, mentioned by zoologists. The geographical distribution of the two species is quite different. *H. leucophæa* was limited to the province of Swellendam, and finally exterminated in 1800; *H. equinus* was not discovered till Dec. 21st, 1801, near Leetakoo (Kuruman), in Bechuanaland, many weary leagues from “the valley of Soete Melk.” Had the Blaauwbok occurred in the intervening district at any time, surely its remains, even if semi-fossilized, would have been unearthed before now.

I have compiled the following census of all recorded specimens, many of which unfortunately cannot now be found:—

1. Pallas’s type-specimen. Obtained previous to 1766.
2. The Haarlem specimen. Obtained previously to 1766; mentioned by Allamand.
3. Skin seen by Sparrman near Krakeel River about 1772.
4. Skin bought at Amsterdam previous to 1781. Described by Pennant.

5. Blaauwbok bull shot near Tiger Hoek by Le Vaillant's Hottentot attendant in December, 1781. The French naturalist was fully aware of the value of his specimen, and took a drawing of it on the spot. The skin was carefully preserved.

6. Another specimen (a bull) seen by Le Vaillant during his stay in South Africa, 1781-85 ('Travels in Africa,' *cf.* vol. i. p. 133).

7. A Blaauwbok bull presented to the Governor subsequently to 1782, during Le Vaillant's stay at Cape Town.

8. A Blaauwbok bull had been preserved at Amsterdam for fifteen years in good condition before Le Vaillant saw it. He tells us that all the specimens he saw were much the same, thus unconsciously strengthening the claim of *H. leucophæa* to rank as a distinct species.

9. A specimen shot in 1799, and preserved at Berlin. Described by Lichtenstein in 1814. I do not know if this specimen is still in existence.

10, 11. "Some" shot in 1800, and sent to Leyden in skin (Lichtenstein). The last of their race.

12. Blaauwbok cow preserved at Vienna. Still in existence.

13. Blaauwbok still preserved at Stockholm. Mentioned by Sundevall, who, in his letter to Dr. Gray, pointed out the distinction between *H. leucophæa* and *H. equina*. Gray, however, united the two species.

14. Blaauwbok preserved at Upsala. Still extant.

15. Blaauwbok bull preserved at Paris. This was for many years supposed to be the only specimen of the animal in existence. Harris states that this example was unique, and that it was supposed to have come from the collection of the Stadtholder of Holland. Several zoologists of great eminence have declared it to be an immature Roan. Still in existence.

16. Finally, I may mention the very handsome Blaauwbok preserved at Leyden, which, by the kindness of the Museum authorities, I have examined, photographed, and measured. I do not know any particulars of date or history regarding this specimen.

This very fine specimen probably carries the record horns. Measurements of horns: length (along curve), $24\frac{2}{5}$ in.; max. circumference, $6\frac{4}{5}$ in.; max. divergence, $8\frac{2}{5}$ in.; min. divergence,

1 $\frac{1}{5}$ in. Other measurements: height at withers, 49 $\frac{3}{5}$ in.; length of ear, 9 $\frac{3}{5}$ in.; length of mane, 1 $\frac{1}{5}$ in.; tip of muzzle to root of tail, 73 $\frac{1}{5}$ in. No of annulations on each horn about 35. These characters in the Leyden specimen compare very favourably with those of the bull at Paris (horns 21 $\frac{1}{2}$ in., with 28 annulations, 45 in. at withers), and the cow at Vienna (40 in. at withers). The almost uniformly coloured face and moderate-sized ears of the Blaauwbok contrast markedly with the magpie face and immense ears of the Roan Antelope.

In addition to these skins and stuffed examples, one may mention the broken horn, supposed to have belonged to this species, figured by Buffon. I have also examined the horns and frontlet of this rare Antelope preserved in the Natural History Museum at South Kensington. I do not know from what specimen the so-called "Blaubok or Etaak," figured on p. 651 of the Rev. J. G. Wood's 'Natural History,' is taken; however, it does not matter, for the animal there delineated is obviously a Roan Antelope, and no Blaauwbok at all; whilst the accompanying letterpress also refers to *H. equinus*.

Unfortunately, as Burchell's Zebra is now so often called "Quagga" (though the true Quagga has been extinct since 1879 at very latest), so also the name "Blaauwbok" has been applied to the Blue Duiker (*Cephalophus monticola*), a tiny Antelope no bigger than a Hare, occurring in Cape Colony and Natal. It is regrettable that this little creature, with its mouse-dun coat, tiny horns, and insignificant stature, should be liable to be confused with the beautiful Blaauwbok of Swellendam, a worthy representative of the glorious Hippotragine Antelopes, which even to-day include the Fighting Sable, the handsome Gemsbok, and the gallant Fringe-eared Oryx.

That the splendid Antelopes yet remaining may be saved by prompt and efficient protection from the untimely fate of the Blaauwbok must be the earnest wish of every true naturalist. Purple Sassaby, Red Hartebeest, Magpie Blesbok, Striped Kudu—these man can destroy, but cannot replace; and if this essay contributes ever so little towards the preservation of that magnificent fauna whose noble presence even to-day gives to many an African landscape the appearance of a vast zoological garden, it will not have been written in vain.

MISCELLANEOUS JOTTINGS ON BIRD SONGS.

BY E. LEONARD GILL.

THOSE who for any purpose have had to estimate the reliability of records sent in by different people—of such occurrences, say, as the arrival of migrants—will have found that the field of observation of many persons has curious limits. Many sportsmen are keen and accurate observers of game-birds and wild-fowl, and yet know practically nothing of the other birds they so constantly meet; while people who have earned and deserve a reputation as good ornithologists on account of their wide general acquaintance with birds and their eggs, are often quite unable to recognize any but the most obvious of bird notes; a fact which at once discounts the value of their records of the arrival of summer migrants. It is remarkable, for example, how few people can distinguish the song of the Redstart; and yet the arrival of this bird in the spring is often made known by its song for more than a week before a chance occurrence gives a glimpse of the bird itself. The Lesser Whitethroat, again, is a bird which, on account of its retiring habits, is very generally overlooked, in spite of the fact that the loud notes at the end of its song make its presence always easy to detect; even in districts—such as parts of Cheshire and the Plain of York—where the Lesser Whitethroat is as common as the Sedge-Warbler, one is often told that it is extremely scarce. Another note which few people seem to know is the scrappy song of the Whinchat, a song which may be compared to that of a Whitethroat borne to the ear in a broken-up fashion on a gusty wind.

The Wood-Wren's song is certainly more commonly recognized, but in this case again it will often be found that people of local repute as ornithologists do not know the note, and are thus quite unable to judge of the bird's presence and numbers in any particular district. It may be here worth while to mention the extraordinary abundance of the Wood-Wren in Wales—at any

rate, in the summer of 1901 and in the district lying between Harlech, Dolgelly, and Towyn. In Mr. Howard Saunders's 'Manual of British Birds' the Wood-Wren is stated to be "found in suitable localities throughout England, and, more sparingly, in Wales"; but nowhere in England has the writer met with it in such remarkable numbers as in the lovely wooded valleys of the part of Wales spoken of above. It is no exaggeration to say that it was there at least twice as numerous as the Willow-Wren or Whitethroat, or any other of the Warblers. The Wood-Wren often uses a curious wailing cry, generally when an intruder is near its nest, but often also at other times; this cry consists of a series of about eight loud notes, regularly timed, sometimes maintained at the same pitch, but more often sinking slightly so that the last note of the series is about one tone of an octave below the first. The effect of this is very striking, and arrests the attention in a moment.

There are people who believe they can invariably tell the Garden Warbler's song from the Blackcap's; in fact, the writer until recently held that opinion in regard to himself. But his confidence was shaken in the early summer of this year (1901) by experience in a large Yorkshire woodland, where both these birds were singing in some number. There is, of course, no difficulty whatever in distinguishing the typical Garden Warbler's song from the typical Blackcap's; the difficulty comes in when the discovery is made that the Blackcap is in the habit of singing them both. Careful attention will reveal the fact that the Blackcap quite frequently sings for a considerable time a wandering melody that is indistinguishable from that of the Garden Warbler; at the end he may or he may not break out into his own loud and liquid strain, which is a song of fixed length and cadence. It should be understood that what is here referred to as being indistinguishable from the Garden Warbler's song is not the subdued and pretty soliloquy that the Blackcap practically always prefixes to his own typical strain; the notes referred to are so exactly similar in character to the Garden Warbler's that it may be truly said that the Blackcap, on occasion, at least, sings the Garden Warbler's song as well as his own.

Few birds are held in less esteem for their vocal powers than

the Snipe; yet some individuals of the species, if not Snipe in general, are capable of a performance that well deserves the name of a song. In the south of Yorkshire is a certain small bog where several pairs of Snipe breed annually. In the centre of a field adjoining the bog stands a large dead tree with only its gaunt main branches left; and it was a customary thing to see a Snipe pitch upon the summit of the topmost limb of this tree, and there give utterance, sometimes for a quarter of an hour at a stretch, to his unique song. This song was loud, vigorous, and sustained, and, though it was quite evidently an elaboration of the ringing cry so often uttered by the Snipe on pitching, it was very considerably modulated. Through the glasses it could be seen that the bill during this performance was held horizontally, and that the head was continually turned about from side to side. It was, of course, impossible to determine whether it was always the same bird that was responsible for this song; but the song was to be heard quite regularly during, at any rate, one breeding season—that of 1898; and the writer heard it again, still from the same point in the same dead tree, on the only occasion during the following spring on which he was able to visit the bog. Very possibly this singing of the Snipe is one of its normal accomplishments, but the writer has neither seen any mention of it, nor met with the phenomenon itself in any other locality.

The fact has been frequently noticed that many birds will occasionally sing on the wing which do not normally do so. This is commonly to be observed in the case of the Blackbird and Mistle-Thrush, and of the Greenfinch, Sedge-Warbler, and Wood-Wren. One thing is always noticeable about these birds when they are singing on the wing, and that is the peculiar mode of their flight. In every one of them there is a very evident pre-occupation of mind; the wings give a slight and neglected stroke and appear to be unusually widely opened, while the resulting flight is slow and sailing. When the Blackbird, Mistle-Thrush, and Wood-Wren are singing on the wing, they are, as a rule, drifting across from one tree to another in a straight line; but the flight of the Greenfinch and Sedge-Warbler is undertaken for the special purpose of the song, and it follows an aimless and erratic course through the air. The Wood-Wren will frequently

start its song just as it leaves a tree, and however long its flight may be (it is never of any great length), it maintains throughout it the slower opening phrases of the song, saving up the rapid concluding trill until the moment of its alighting in the second tree.

The most remarkable instance of a bird's singing on the wing that has come under the writer's notice was one furnished by a Chiffchaff. The bird was chasing another, presumably the female, on the outskirts of a wood; the two were flying at an incredible speed close to the ground and near a hedgerow, the pursued making sudden turns and twists, which were followed closely and with perfect precision by the pursuer; and one of them, probably the pursuer, was repeatedly uttering the clear "chip, chop" almost as placidly as though he were singing from his accustomed tree-top. It may be remarked in passing that the powers of flight held in reserve by these smaller Warblers are extraordinary. This fact is occasionally illustrated in a most surprising manner by the Willow-Wren. Just after their arrival in the spring (possibly when only the males are about), Willow-Wrens are exceedingly pugnacious, and one may sometimes be seen to take up a position on a post, or in the lower branches of a tree, and from there to make fierce sallies upon any bird not larger than a Finch that happens to be flying by; it will always take especial pleasure in attacking a Sand-Martin—indeed, the Sand-Martin seems to be a common butt for any small bird's exuberance of spirits; and in every case the Willow-Wren will exhibit on the wing a command both of speed and agility which is in the greatest possible contrast with what one would expect from the everyday deportment of its life. It is a sight that in a measure prepares one's mind for the startling conclusions reached by Gätke, and makes it a little easier to understand how such small and delicate birds as these can conduct with so much speed and success their long migrations overseas.

The slight revival of song that takes place in the autumn has often been remarked upon. The most conspicuous part in it is taken by the Chaffinch, Yellowhammer, Willow-Wren, and Chiffchaff; the Lesser Whitethroat also sings a good deal in early autumn, but omits the string of loud notes that form the ending

of his full song—in fact, his autumn song is nothing more than a very subdued warble, so low that it cannot be heard beyond a few yards' distance, and kept up almost continuously whilst he creeps about amongst the bushes. The duration of this autumn singing appears to depend very much on the weather; in the case of the Chiffchaff and Willow-Wren it usually begins with August, and lasts until early in September; but in the phenomenally hot autumn of 1897 the Willow-Wren was singing every day in the south of Yorkshire up to the 30th of September, and the Chiffchaff up to the 3rd of October; whilst in the mild winter which followed, both Chaffinch and Yellowhammer were singing occasionally until well on in December; and both were once more in song before the end of the following January—the Chaffinch for the first time on January 21st, the Yellowhammer on the 25th.

AN OBSERVATIONAL DIARY OF THE HABITS—
MOSTLY DOMESTIC—OF THE GREAT CRESTED
GREBE (*PODICIPES CRISTATUS*), AND OF THE
PEEWIT (*VANELLUS VULGARIS*), WITH SOME
GENERAL REMARKS.

BY EDMUND SELOUS.

(Continued from p. 350.)

May 3rd, 1901.—I was here this morning from about 4.30 a.m., but an unfortunate circumstance obliged me to leave at 7; and on the following day I was unable to come, owing to being indisposed. Up to my leaving, no pairing and no peculiar antic or display between the two birds—as witnessed the previous morning—had taken place. Twice, however, the two had approached the nest, and each had lain along the water, as though inviting the other, in the way I have recorded in my notes of last year. On each occasion this was followed by an approach of the birds to the nest, but the impulse was not sufficient to cause either of them to ascend it, though this was evidently in their minds. This, together with all their actions in this respect which I have witnessed, makes me think that the actual pairing of these birds takes place, always, either on the nest itself, or on some structure of weeds, either naturally or artificially formed for the purpose, the lying along the water being only the suggestion preliminary to the subsequent ascent. Such, at least, has always been the case, and the manner in which the pairing is accomplished, the one bird standing entirely upright—like a Penguin—on the body of the other, would seem to necessitate some solid foundation. Nevertheless, the lying along the water may point to a past state of things, in which pairing took place in it, as it does now with Ducks.

During all the time I was here (from 4.40 to 6.45, to be precise) neither of the two birds carried any weeds to the nest, or

at all busied themselves with it. Assuming the nest to be the ordinary one in which the eggs will be laid, then it has been built earlier than it was the previous year—at least than the one which I first saw. Also, it differs in hardly being raised above the surface of the water—no more, in fact, than a floating weed—so that it is undiscernible, unless when standing just over it, whilst the other was quite conspicuous.

May 5th.—At the water just after 7 a.m. (having had to walk), and find the two birds separated by some distance. The male is near me, but soon works back to the female, and, when they meet, they utter the curious, low, quacking kind of note. They are now floating idly on the water. Each time I see them together, or even apart, I am more struck with the superior size of the male. His body is larger, his neck thicker and held habitually higher, his crest finer and thicker, his whole appearance more striking. It would not be easy for me, now, to mistake one for the other through the glasses, even at a considerable distance, nor have I ever, in fact, had a real doubt except when I was a long way off. The two are now fishing, and very successfully, for they often bring a fish up and swallow it on the surface.

It is very funny to see not only the foot, but the whole leg of one of these Grebes lifted right into the air, and shaken backwards and forwards—waggled about. This has just happened with the hen.

At a little past eight the two have fronted each other in the water, and toyed in the usual manner. But nothing more has come of this, and it is now near 9.30. It is a cold ungenial morning.

At 10 I leave, nothing more having taken place, or seeming likely to take place, between the birds. Yesterday I was not able to come owing to headache.

May 9th.—I am at the water at 7.30 this morning, and find the Grebes swimming about together. Twice they front each other in the water, stretch up their necks, and toy a little with their beaks; and a third time they do this less definitely. But they do not go to the nest. At 8.10 I notice them diving somewhat excitedly, as it seems to me, one going down as soon as the other does, and sometimes—especially once—with a little splash.

They also get over by the opposite shore, close in and together, and I am expecting a repetition of the curious actions I saw before, and which directly preceded the pairing on the nest. Nothing of the sort takes place, however, and in whatever way this diving may have begun, the birds are soon merely fishing. I wait till about 8.30, and then walk down to the nest, and once more carefully examine it. It is certainly a made structure, but, as certainly, altogether slight and insignificant, compared to those of last year. One might call it a degenerate nest, and it certainly suggests the idea that it has only been constructed—up to the present, at least—for the purpose for which it has alone been used.

May 11th.—Arrive at 7 a.m., and see the Grebes confronting, &c. Shortly afterwards they swim to the accustomed place, and the female—who leads the way—lies along upon the water amongst the growing weeds. The male goes up to her, appearing interested, but all at once he turns right round, so that the two are tail to tail, and lowers his own head, lying along in the same way, but not to such a complete extent. Both, then, resume the normal attitude, and, approaching each other, the male passes the female, and, pressing to the nest, ascends it, and lies along in the customary manner. The female, however, though her actions show that she is quite aware of the state of the case, does not respond, and the male, soon taking the water again, first dives and places a piece of weed on the nest, and the two then swim away together and float, dive and preen themselves, as usual. At 7.30 the male swims to the nest, and lies along on the water close to it. He is followed by the female, who, when she arrives at the patch of weeds, does the same; but there is nothing further, and, very shortly, the two swim off together. At 8.15 both again swim to the nest, and the male, who is much in advance, ascends and lies along it, as before. This, however, has the effect of making the female turn and swim out to some little way, as though coyly. The male comes off and follows her, when, turning, she eagerly swims to him; but when they join there is nothing particular between them. There have thus, this morning, been several visits paid to the nest with the idea of pairing, and two ascensions by the male. Now the morning is fine and warm, the lake once more a sun-bath, though

misty. For the last week the weather has been cold and detestable. The birds' inclinations and activities seem to follow the weather. At 8.20 I have to leave, so cannot say if the actual pairing was accomplished or not.

May 13th.—At the water to-day at 11 a.m., and again at about 1.30 p.m. Each time the Grebes were floating idly about, and showed no disposition towards connubiality.

May 14th.—Arrive at about 7 a.m. The two birds are floating idly about together, and, before long, they front each other with reared necks, in the way often alluded to. Then, without *tâter*-ing, each throws up the head several times into the air, at the same time opening and closing the long slender bill. This I have seen them do several times before, but hardly so pronouncedly. The bill, however, is so fine, and its lines, when thus opened, so soon lost, that this action makes less impression upon one than the gross gobble—as one may call it—of the Shag, and (no doubt) the Common Cormorant. It is a finer and more aristocratic affair altogether. It has a lady-like character—indeed, this can be said of the general appearance and deportment of both the birds. Bismarck, I think, has said, “In races, also, you have the male and the female.” The remark was *à propos* of the Slav peoples, yet the Russian nationality, at any rate, if it shows—really or fancifully—some feminine traits, seems, at least, as strong, persistent, and inflexible as the German, or any other Teutonic one.

In about half an hour the two birds begin fishing, starting off diving with excitement and energy, and, as it seems to me, with a certain amount of consciousness between them. After a time they become separated, and, for a good while, one floats on the water (having finished fishing) quite alone. Now, however, the one is swimming down to it, and they soon rejoin. Both are now floating with their heads in the middle of their backs, looking like pork-pies on the water. As it is now half-past eight, and there is no sign of any nuptial activities, I leave.

My diary ends here. For several mornings after this, and then, on and off, till the end of the month, I continued to visit the lake, but the doings of the birds became less and less interesting, and it became, at last, evident to me that no eggs would be laid. Going again, on the 12th of June, I was unable to dis-

cover them on any part of the water, and came to the conclusion that they had abandoned it and the nest.

From the above observations, as well as those which I made last year, it may, I think, be concluded that the nest of the Great Crested Grebe is used, habitually, by the birds to pair on; so that, if it were used for no other purpose, and the eggs were laid elsewhere, it would not be a nest at all. It would, in fact, then be a "bower," or something very much resembling one—a *thalamum*, round and about which, in time, all the bird's coquetties might take place; whilst its subsequent gradual elaboration and ornamentation, in the case of species gifted with a higher æsthetic sense, offers no particular difficulty that I can see. Inasmuch, however, as the instinct of incubation would in all cases—we may assume—when the eggs had once been laid, overpower the primary sexual one, why should the two clash with each other, and, if they did not clash, why should not one and the same structure subserve, without inconvenience, the uses of both? First, it must be remembered that these Grebes paired on the nest, after one egg, at least, had been laid. Here, therefore, is a risk of the eggs being broken, and anything that diminished such risk would be an advantage to the species. But I have suggested another, and, as I think, a more powerful cause, by which the bower or *thalamum* may have become, in time, a distinct and separate structure from the true nest—as we see in the case of the Bower-birds. If I here repeat myself, somewhat, I hope I may be excused, for I wish to recall the speculations already indulged in, before proceeding to some further ones, which arise, naturally, out of them, whether supported or not by facts which I have observed, and will shortly record. Many birds, then, build more than one nest; and, if all of these nests were used as *thalama* for the performance of the nuptial rite, whilst only the last-made one received the eggs, then, gradually and quite naturally, two separate structures for two separate purposes might take the place of the one "contrived a double debt to pay." This would be but according to the principle of differentiation, or specialization ("specialization of parts," one might almost, by a metaphor, call it)* which prevails

* Comparing the different nests to multiplied organs of a living body, as *c.g.* the limbs of some crustaceans, which, being at first used both for walking and other purposes, have now become specialized into jaws, claws, and more effective legs.

throughout nature. Moreover, as the eggs would only be laid—after a full indulgence of the sexual passion—in the last nest, the incubating instinct might gradually restrain the birds—now somewhat sated—from pairing on that one; whilst the others, being used for that purpose only, would tend more and more to be built for it only, too. With regard to the multiplication of nests, we have the Wren as a familiar example of the habit, whilst my last year's observations on these same two Grebes record it in this species. Peewits are another instance, for they make a number of hollows, in all respects similar to the one in which the eggs are finally deposited, though, from their strange manner of doing this, another question arises, which I shall shortly bring forward. None of these birds are at all closely allied to the Bower-birds of Australia, but in the Thrush and the Blackbird we, at any rate, get a good deal nearer to them. With regard to the Blackbird, I have seen one clear instance of an apparently quite capricious abandonment of an almost finished nest in order to build another; nor is it in the least likely that I happened here—any more than in the case of the Grebes—to come upon a pair of very exceptional birds. It is the rarest thing, I think, speaking generally, to meet with a real exception. The appearance of it, in nine hundred and ninety-nine cases out of a thousand, marks but our ignorance. There remains the Thrush, and to this bird I paid some attention this spring, and was surprised at the number of nests which I found in different stages of construction, and which were not afterwards completed. That birds have, as a rule, any particular—or, at least, any clearly defined—object in building more than one nest, I do not myself believe; but, be that as it may, such a habit, joined to the one of pairing on the nest, appears to me to offer just that sort of foundation out of which such a state of affairs as we have with the Bower-birds might eventually arise.

But now another question arises. If a certain structure—the nest—is habitually made use of by any species of bird for pairing as well as for laying eggs in, which of these two uses are we to consider as the primary, and which the secondary? In other words, has the bird built a *thalamum* which has become, in time, a nest, or a nest which has become a *thalamum*? This brings us to the origin of nest building, which need not,

necessarily, have been the desire to shelter and conceal the eggs. It is possible that both that and the idea of doing so were developed after, and by reason of the nest itself, which, in its early stages, may have been due to other and widely different causes. Eggs and young must, of necessity, be preceded by sexual intercourse, and in the case of the Crested—probably of all the Grebes—it seems likely that such intercourse takes place on the nest alone. With the vast majority of birds, however, this is quite otherwise. Pairing on the nest, if it takes place at all (I have observed it in the case of the Rook, which again brings us nearer to the Bower-birds), does so probably as an exception, nor is it easy to see why this should ever have been otherwise. But (if I may be allowed to sketch my theory first, and give the facts on which I found it afterwards) let us assume two things, neither of which, perhaps, is highly improbable—*viz.*: first, that the primæval bird, or birds, made no nest; and, secondly, that the first eggs were laid on the ground. Supposing, then, that a male ground-laying bird that makes no nest indulges during the season of love, till shortly before the actual laying of the eggs, in all sorts of strange frenzied movements *upon* the ground, and that these movements tend to become localized and concentrated in some particular spot or spots in which—or one of which—the female, as sexually attracted thereto, ultimately lays her eggs, have we not here the nucleus, or, at any rate, the potentiality, of the future nest? And where—before the eggs were laid—would pairing have been so likely to have taken place as in one of these very spots—these vortexes, so to speak, of the sexual whirlwind? Can we not imagine a custom, gradually shaping itself out of this, of laying the eggs in some place where pairing was habitually indulged in, so that if such place afterwards became, in any true sense, a nest, we would here have habitual pairing upon it?

Having got so far, let us now suppose that one chief form of these frenzied movements alluded to, is a rolling upon or a buzzing or spinning over the ground, by which means the bird so acting produces a larger or smaller depression in it. If the eggs are laid in such a depression, they are now laid in a nest, but such nest will not have been produced with any idea of concealing the eggs or sheltering the young. It will be due to nervous and non-purposive movements springing out of the violence of

sexual passion, and, moreover, it will often have been made mostly, if not altogether, by the male bird. Now, as everyone knows, numbers of ground-laying birds deposit their eggs in a depression made either wholly or partly by themselves; whilst others, such as the Great Plover and the Nightjar, do not—that, at least, is the common view—make any kind of artificial hollow, though they may, in some cases, take advantage of a natural one. We will suppose that in the former case, as well as in some instances of the latter, we see the primitive nest or pairing-place, produced or located in the manner indicated. Now, however, comes a farther stage which, it might well be thought, could have originated only in deliberate and purposive action on the part of the bird. I allude to the lining of grass, moss, sticks, or even stones or fragments of shells, with which many birds who lay their eggs in a hollow made by them in the ground, further improve it. That this process (or, at any rate, the later stages of it) has now, with most birds, become a deliberate one, I do not doubt. But, as every evolutionist will admit, it is *the beginnings* of anything which best explain and are most fraught with significance. Is it possible that even the actual *building* of the nest may have had a nervous—a frenzied—origin? Lions and other fierce carnivorous animals will, when wounded, bite at sticks, or anything else lying within their reach. That a bird, as accustomed to peck as is a Dog or Lion to bite, should, whilst in a state of the most intense nervous excitement, do the same, does not appear to me to be more strange, or, indeed, in any way peculiar; and that such a trick would be inherited, and, if beneficial, increased and modified, who (having evolution in his soul) can doubt? If a bird, whilst ecstatically rolling on the ground, were to pick up and throw aside either small sticks, or any other loose-lying and easily-seized objects—such as bits of grass or fibrous roots—I can see no reason why it should not, by stretching out its neck to such as lay only just within reach, and dropping them again when in an easier attitude, make a sort of collection of them close about it.* Then, if the eggs were laid

* Since writing this paper I have read that of Mr. Cronwright Schreiner on the Ostrich in 'The Zoologist' for 1897, and as a part of it seems to me to support my theory, I quote it here, though it should be read, also, with reference to some of those actions upon which I found it, and which I am about to recount;—

where the bird had rolled, they would be laid in the midst of such a collection, which would, of course, be increased, were the female bird to act in a similar way, and in the same place. Nor is this last so unlikely, for in many species both sexes indulge in the same odd postures and contortions during the breeding season.

All the above suppositions have been suggested to me by what I have actually seen birds do whilst under the influence of strong sexual excitement, and, though I am ready to admit that the foundation of fact may have been slight in comparison with the superstructure of theory raised upon it, yet there can be no harm in a provisional hypothesis; and, besides, what is the use of staring at facts with eyes that have "no speculation" in them? For myself, I shall always strive to see the causes of things with the things; nor do I know of anything worse that can happen to one by this method than to have it pronounced on all hands that one's theories are "less happy" than one's records of facts, a dictum which, till argument is met by argument, one may take to mean something like this—"We are equal to a fact or two, but theories make our heads spin round."

(To be continued.)

"*The nest*.—... "made by the pair together. The cock goes down on to his breast, scraping or kicking the sand out backwards with his feet, &c. The hen stands by, often fluttering and clicking her wings, and helps by picking up the sand with her beak, and dropping it irregularly near the edge of the growing depression.

"The little *embankment* round the nest. . . . The sitting bird, while on the nest, *sometimes pecks the sand up with its beak nearly as far from the nest as it can reach, and drops it around the body*. A little embankment is thus gradually formed. . . . The formation . . . is aided by a peculiar habit of the birds. When the bird on the nest is much *excited* (as by the approach of other birds or people) it snaps up the sand *spasmodically* without rising from the nest, and without lifting its head more than a few inches from the ground. The bank is raised by such sand as falls inward. The original nest is merely a shallow depression."

Remarks follow on the use of the bank, which has become a part—and an important part—of the nest. We, however, are concerned with the *origin* both of it and the depression. It seems clear, from the account, that the former is sometimes made, or added to, when there can hardly be an intention of making it; whilst, to make the latter, the cock assumes the attitude of sexual frenzy (described in the same paper), which is one, as it seems to me, hardly necessary for mere scratching alone. Had the latter, however, grown out of the former, we can well understand the characteristic posture being continued. The italics are my own.

ON THE INCREASE OF THE STARLING AND THE HAWFINCH.

By H. E. HOWARD, F.Z.S.

THAT an increased population must very considerably affect the life-history of many of the birds of this country is a fact which, I think, is apparent to all who take an interest in the avifauna of Great Britain. To determine what changes are in progress at the present moment is, however, no easy matter; but still, I think, there are some which can be readily fathomed.

As amongst all animals, so amongst birds, the survival of the fittest plays the most important part in the formation of their history; that is to say, certain species will increase, others will decrease; partly because their habits are not adapted to the changes brought about by civilization, partly as a direct result of the growth of some stronger and opposing species. There is too great a tendency at the present time to seize upon the fact of the decrease of a certain species, and to exaggerate it into a proof that the birds of this country are in a bad way; and, as a rule, the cause is directly attributed to human agency. This tendency—due to what I might term a too superficial observation, combined with the fact that it is far more difficult to determine an increase than a decrease in a certain species—is, to my mind, a great pity, as it is calculated to diminish that scientific observation which, carried on at all seasons of the year, can alone give an insight into those problems of ornithology which the naturalist is constantly called upon to investigate.

The real changes that are in progress are therefore apt to be overlooked, and their effect on the history of certain birds of this country does not appear to be fully appreciated.

In this article I propose to deal with two species that are increasing, with results that, from my own observations, appear likely to accrue. The first of these is the Starling, a bird which probably possesses an energetic force to a greater degree than any

other species in this country. The great factors which govern the life of all birds are—first, food; and, secondly, immunity from attack during the nesting season. Climate, of course, also plays an important part, periodical seasons of extreme cold having an appalling effect on certain birds. But Starlings have very little to fear from any of these, their habits being in every way suited to human civilization; their diet is so varied that they are very rarely short of food; their nest is always built in holes, either in houses or trees, and therefore they are practically safe from that pest that follows in the wake of all civilization—the domestic Cat. And what is the result? The same energy which compels them to seek food, compels them also to find somehow or somewhere suitable places to rear their young, the consequence being that some other species has to suffer. For some years past I have watched the struggles enacted between Starlings and Green Woodpeckers for the possession of the latter's nesting-site, and in not a single case have I seen the Woodpeckers able to hold their own. I should like to be able to think that these cases are only local, but cannot do so, as every year, without in any way searching for them, the same struggles, both near habitations and in large woods and forests, are being continually forced upon my notice. The country now appears to be, so to speak, inundated with Starlings. Near the house I was able daily to watch two cases most closely, and to note how the Starlings planned their attack, and the length of time they took to achieve their object.

In the first case the struggle lasted a week; in the second, I was beginning to congratulate myself that at last a Woodpecker had won the day, when one morning I noticed, with great disgust, a Starling, carrying straws in its bill, disappear into the hole, thereby proving that the fight was over. If it was only a pair of Woodpeckers *versus* a pair of Starlings, I think it very probable that the Woodpeckers would hold their own; but it is not so. A number of Starlings collect on or about the tree in which the Woodpecker is, and they all in their turn mob him, and worry his life, until, tired out, he goes off in the hope of finding some other place where he can nest in safety. It is obvious that Woodpeckers are a class of birds whose habits are clearly not adapted to civilization, while woods and forests are

continually decreasing in every direction ; trees that show the slightest sign of decay are by the present utilitarian generation immediately felled. In many districts in this part of the country* the Pied Woodpecker is barely able to find sufficient suitable trees to make up its daily round. A curious fact about these birds is that, at the same time each morning one can see them arrive at a certain tree, search it thoroughly, and pass on to another, the trees to which they come and go being always identically the same, proving that they have a round they visit daily.

Added to this, we have an increase of a stronger and opposing species, and I cannot but believe that in, comparatively speaking, a short period, extinction thus caused by natural selection is bound to follow.

And how does this apply to the Hawfinch ? The increase of these birds is perhaps more remarkable than the Starling, and at first sight more unaccountable. But when we come to examine their habits and life-history, and to see how the conditions now existent apply to them, the cause of their increase becomes more apparent. That there is a very remarkable increase requires very little observation to prove, and to me it has become yearly more interesting. Fifteen years ago I rarely saw this bird ; five years ago small parties of five and six were not at all uncommon ; and during the winter now I frequently see as many as a dozen under one yew. This year eight pairs nested within half a mile of my house. At this rate of increase the bird will soon rival the Greenfinch in abundance.

Food, of course, gives the limit of numbers, and they depend to a great extent on civilization for their food ; and in this fact we shall find, I think, a reason for their increase. As the population grows, so does the need of market-gardens, with an increase in the cultivation of vegetables, and thus more peas are grown, which, from the middle of June to the end of July—that is to say, for the first six weeks after the young are fledged—form their staple food. This time of year used undoubtedly to be the most difficult one for them to procure food. In the winter, contrary to the experience of other birds, they have always a plentiful supply of food. One can then find them feeding on the berries and seeds of holly, yew, and hornbeam, and in that they

* Hampshire.

only eat the kernels, they have an advantage, devouring what other birds discard. They are also better off than they used to be for nesting-sites, the large orchards in fruit-growing districts affording them ample shelter. A very large proportion of the nests I have found have been in apple-trees, which seems to have been the experience of others; and, as a rule, the nests are not far from the ground, and in their size vary to an unusual extent; some, even where I have known the exact spot, being exceedingly hard to see, on account of their being so lightly built; others are large bulky nests, which you can hardly help detecting at once when near the tree; but the orchards are large, and therefore this species has a good chance of rearing its young in safety. It is difficult to forecast how this will affect other species, but the Hawfinch is a pugnacious as well as a very strong bird, and if this rate of increase is maintained—as there is every reason to suppose it will be—then some other weaker species already struggling with the physical conditions of life is bound to suffer; but the result to farmers and fruit-growers is very apparent. At first sight it appears unlikely and almost incredible that a few Hawfinches could do much damage to a field of peas; but if anyone has any doubt on this point, let him watch the birds at work, and see how a family takes up its abode in a field, and how from early in the morning until late at night they are hard at work splitting up the pods; when I think even the most incredulous will be compelled to admit that at least a great deal of damage is done. It remains, however, to the unlucky persons who possess cherry-orchards, and look to them as a source of income, to suffer most from the depredations of this bird, although probably few of them are aware of the fact. For some time I looked upon Hawfinches as birds that did little harm during the month of May; as a rule, they appeared to me to feed entirely on the seeds of the oak at this time of year, but I discovered my mistake when looking for the nests. Having watched the birds for some time in and out of a cherry orchard on the borders of a forest between the hours of three and five in the morning, I concluded that they must be nesting in it; I therefore searched every tree, and, having failed to find any trace of a nest, I thought it best to wait and see for what reason the birds visited the orchard. This I did, with the result that before

long a pair settled in the tree under which I stood, and began to feed upon the fruit, which at this time of year is just setting. In common with some other species, they appear to be less shy during the breeding season. While standing under a cherry-tree, I have watched them at work within six feet of my head, and to see the quick way they pass from branch to branch, and the pieces of what would be cherries falling to the ground, one wonders how it is possible for any fruit to come to maturity at all.

Between three and six in the morning is the best time to watch them feeding—in fact, all observations during spring and summer, to be of any use, ought to be made at that time of the morning. After seven o'clock birds slacken off, and during the day activity amongst them, as compared with the first few hours after dawn, is practically *nil*. I am much afraid that the Hawfinch will in future become another scourge for the already much to be pitied fruit-grower.

And here, perhaps, it would not be out of place to say a word for those whose existence depends to a great extent on a good fruit crop. How during the month of July can they be expected to conform to the rules and regulations as regards wild birds. No firing of guns, shouting, or any of the wonderful devices you see placed in the trees have the least effect in keeping away the birds. Nothing but killing—and even this to be of any use must be commenced directly the fruit shows any signs of ripening; for, if the birds are once allowed to get out of hand, not even killing will keep away what I can only describe as the vast hordes which assemble round the orchards. Of late there has been too much whining about the imaginary decrease of the birds of this country. It is quite time this ended, and in its place more common sense and closer observation cultivated, as by these means alone can we hope to discover in what direction it is possible for man to facilitate the union of nature and agricultural interests.

BIRDS OBSERVED ON THE CALF OF MAN.

BY F. S. GRAVES AND P. RALFE.

THE following notes were made during a four days' stay on the Calf of Man (May 22nd-25th, 1901). This islet (*cf.* Zool. 1894, p. 161) is separated from the Isle of Man by a strait 500 yards wide, and is 616 acres in extent, rising at its western side to 421 ft. in height. The whole circuit is rocky, but the highest cliffs are on the west, which is wholly precipitous. The north-east point, Kione Rouayr, has also good cliffs; the southern part consists of three promontories, comparatively low, but with steep sides, and nearly flat tops. Off the easternmost of these is the Burrow, a fine detached mass of rock pierced by a cavern; and on the west, underneath the two lighthouses (now disused for their original purpose), a double pyramid, called the Stack, separated by a narrow passage whose walls are sheer precipices. From the southern coast, towards the one farmhouse, which stands well inland, extends a little ravine called "the Glen," which has a tiny stream, and is full of profuse and beautiful vegetation. Here were noticed most of the small migrants mentioned below. There is some cultivated ground, mostly near the farmhouse, behind which are also a few trees: but the greater part of the islet is covered with heather, bracken (dead at the time of our visit), and coarse grass. There was in many places an abundance of beautiful flowering hyacinths, and in others primroses richly bloomed, or the ground was covered with sheets of ground-ivy, filling the air with scent. Damp places along the cliffs were white with masses of the flowers of *Cochlearia*.

While on former occasions our knowledge of the Calf had been entirely obtained from the sea, we were now for the first three days confined to the land; but on the fourth rowed completely round the islet.

MISTLE-THRUSH (*Turdus viscivorus*).—One seen on a field near the farm.

SONG-THRUSH (*T. musicus*).—One or two in the Glen.

BLACKBIRD (*T. merula*).—Saw a number. In a gooseberry-bush outside the cottage where we lived was a nest with eggs.

WHEATEAR (*Saxicola cinerea*).—A few noted.

STONECHAT (*Pratincola rubicola*).—Pretty common, as on the main island.

WHINCHAT (*P. rubetra*).—We saw two ; one in the Glen, one near our cottage. The species has only once before been recorded in Man.

ROBIN (*Erithacus rubecula*).—One seen in enclosures near the mouth of the Glen.

WHITETHROAT (*Sylvia cinerea*).—A good many, especially in the Glen and about the cottage, with its adjacent bushes, where one was heard singing.

GARDEN WARBLER (*S. hortensis*).—We saw one bird of this species among bushes in the Glen. The status of the Garden Warbler as a Manx bird is very uncertain.

WILLOW-WREN (*Phylloscopus trochilus*).—A few, very wild. (Some of these might possibly be Chiffchaffs, but the latter appear to be rare or local in Man, whilst *P. trochilus* is common and abundant.)

HEDGE-SPARROW (*Accentor modularis*).—A pair frequented the neighbourhood of our cottage, and had young already on the wing.

MEADOW-PIBIT (*Anthus pratensis*).—Common.

ROCK-PIBIT (*A. obscurus*).—Common. A nest with eggs concealed behind a tuft of sea-spleenwort in a cavernous situation near the sea.

SPOTTED FLYCATCHER (*Muscicapa grisola*).—We observed one or two in the Glen, and one frequented the bushes round the cottage. It has seldom been noticed in Man.

SWALLOW (*Hirundo rustica*).—A few flying about near the Glen, in the sunniest part of the islet.

SAND-MARTIN (*Cotile riparia*).—One seen.

GREENFINCH (*Ligurinus chloris*).—At the house of Lloyds' signal-man (one of the disused lighthouses) was a specimen which had been caught on the Calf shortly before our visit.

CHAFFINCH (*Fringilla cœlebs*).—One was in song near the cottage.

LINNET (*Linota cannabina*).—A few observed.

SPARROW (*Passer domesticus*).—We noted it only at the farm.

STARLING (*Sturnus vulgaris*).—Not uncommon ; about the farm and elsewhere. We heard young calling from a hole in a gully on the cliffs.

CHOUGH (*Pyrrhocorax graculus*).—Numerous and tame. Some were always to be seen feeding in the grass-fields near the farm. One of the coast-gullies ends in a long dark cave, in a hole in the roof of which was a nest. This is a favourite site in the Isle of Man, as elsewhere. Pairs were also evidently breeding elsewhere on the coast.

JACKDAW (*Corvus monedula*).—A number about the farm.

HOODED CROW (*C. cornix*).—We observed several.

RAVEN (*C. corax*).—We saw five together, no doubt a family of the year.

ROOK (*C. frugilegus*).—One seen flying towards the main island.

SKY-LARK (*Alauda arvensis*).—One or two noticed.

CUCKOO (*Cuculus canorus*).—We several times saw one, and once two together.

KESTREL (*Falco tinnunculus*).—One seen. We were shown an egg which a few days before had been taken on a ledge on the rocky side of the Glen.

PEREGRINE FALCON (*F. peregrinus*).—One twice rose from a gully on the coast, where a few sticks of an old nest were to be seen.

CORMORANT (*Phalacrocorax carbo*).—There is a small settlement on the cliffs, a number of nests being placed near together on ledges just under the edge of the brow, and others at a little distance more widely scattered. In the heat the old birds sat with gaping mouths on the great whitened structures, which were very conspicuous. In some nests were young, which could be heard calling; while in others were fresh eggs.

SHAG (*P. graculus*).—Abundant, and nests in many places. Some nests, instead of being close to the water, were high up the broken and stony brows, completely hidden under great masses of sloping rock.

GANNET (*Sula bassana*).—One seen in the Sound. At this season it is frequent round the whole Manx coast.

COMMON SHELD-DUCK (*Tadorna cornuta*).—A pair near a little pond.

PARTRIDGE (*Perdix cinerea*).—We found some feathers; probably the bird had been killed by a Falcon.

[LAND-RAIL (*Crex pratensis*).—We did not hear any, but were told that it inhabits the islet.]

WATERHEN (*Gallinula chloropus*).—Near the mouth of the Glen is a small dam, connected with a disused mill in ruins. In a hole in the bank of this was a Waterhen's nest, and we saw on the dam the mother bird with five downy young. When the nest was built there would be no cover on the water, but the foundation of another seemed to be commenced among a little low vegetation now springing up.

LAPWING (*Vanellus vulgaris*).—Fairly abundant on some waste ground

in the interior, and probably comparatively more numerous here than on the main island.

OYSTERCATCHER (*Hematopus ostralegus*).—Common round the coast, especially among the low-tide rocks of the Sound. A pair were evidently nesting on the rough grassy land near the small pond where the Sheld-Ducks were, and we saw some eggs which had been taken shortly before on the turfy margin of the rocks.

HERRING-GULL (*Larus argentatus*).—The dominant bird of the Calf. Nests in abundance almost all round it, sometimes on the hill-sides at a little distance back from the cliff, but not in the interior of the islet. On the southern promontories, where the turf consists chiefly of sea-pink, the nests were large brown structures formed of the torn-up tufts. Most nests had three eggs or newly-hatched young. In one were a few mangled beetles (*Carabus nemoralis*, *Barynotus elevatus*), and in another some small worms, evidently intended for the first food of the young.

LESSER BLACK-BACKED GULL (*L. fuscus*).—Numbers with *L. argentatus* in certain places, but not so well distributed. Some of their nests had many feathers mixed with the structure. We did not identify any nests with young as belonging to this species, which lays later than the Herring-Gull. Numbers breed on the isolated Burrow and Stack.

KITTIWAKE (*Rissa tridactyla*).—One colony, not large (described Zool. 1894, p. 166). Laying had not yet commenced, though the birds spent much time in unfinished nests on little ledges and projections of the sheer cliff.

RAZORBILL (*Alca torda*).—Well distributed and abundant, but does not crowd to the same extent as the next species. Some eggs seen.

COMMON GUILLEMOT (*Uria troile*).—Very abundant at Kione Rouayr, and on the western cliffs, on narrow ledges. They lay later than the Razorbill, and we noticed no eggs.

PUFFIN (*Fratercula arctica*).—In places there are large colonies, as at Kione Rouayr, and among rock-rubbish under the western cliffs. In May the Puffin was not very much in evidence, though we saw some carrying straws and other nesting material; but when Ralfe again visited the Calf, on July 5th, it was astonishingly numerous and tame.

NOTES AND QUERIES.

MAMMALIA.

Variety of *Vesperugo pipistrellus*.—On Sept. 17th my friend Mr. James Fowler, of Frampton Cotterell, Gloucestershire, noticed a Bat flying about in a lane near Winterbourne Church, which appeared to have perfectly white wings. It was shot a few evenings later, and I had the opportunity of making the following notes thereon :—Adult *Pipistrelle* (*Vesperugo pipistrellus*), female, measuring $8\frac{1}{2}$ inches in expanse; the wings and interfemoral membranes, as well as the ears, were white, like a piece of white tissue-paper; the legs, arms, digits, nose, and lips pinkish white; the fur of head and body very slightly paler brown than in a normal specimen. I have never seen a white-winged variety of any of our Bats, and should be glad if any of your readers could inform me of any other occurrences.—H. J. CHARBONNIER (Redland, Bristol).

Autumnal Litter of Dormice.—In reference to Mr. Forrest's note under the above heading (*ante*, p. 423), I may mention that, having seen it stated in 'The Zoologist' that Dormice were very common in nut-rows on Buckland Common, near Tring, I went there in April, 1893. I had been told of an old man named Butcher who collected young Squirrels and Dormice for the London shops, and whom I interviewed. Both he and a labourer told me that they had never found the nest of the Dormouse in spring, but always in autumn, when the nuts were beginning to appear. Butcher showed me a number of young Squirrels that he had just caught or acquired. I had, like Mr. Forrest, been previously under the impression that the Dormouse bred in the spring.—T. VAUGHAN ROBERTS (Nutfield, Watford).

AVES.

***Regulus cristatus* near Reading.**—On May 25th I found a Goldcrest's nest in a furze-bush, about twelve inches from the ground, on Bucklebury Common, near Reading. The first young one was just out.—G. W. BRADSHAW (54, London Street, Reading).

Nesting of the Marsh-Warbler in Somersetshire.—While examining a small collection of eggs this month, belonging to a friend, I observed

two eggs which I felt certain were those of the Marsh-Warbler (*Acrocephalus palustris*). Subsequently, Mr. H. W. Marsden, of Clifton, was kind enough to confirm my opinion when I forwarded him the specimens, which my friend allowed me to keep. Being questioned as to how he came by them, he stated that he found the nest about two or three feet from the ground in a dense bed of nettles not far away from water. I do not think he observed the bird, being unaware of the rarity he had discovered. The nest contained five eggs, two of which he looted. My friend said he thought they were "rather handsome Blackcaps"! The same gentleman found two other nests in the locality containing young birds, which he believes to have also been Marsh-Warblers' nests. I refrain from giving the exact locality of this rare bird's breeding haunt, in order that it may not be exterminated by ruthless persecution. — CHARLES B. HORSBROUGH (Martock, Somersetshire).

Waxwing at Scarborough. — On Nov. 23rd I saw a Waxwing (*Ampelis garrulus*) feeding on the haws of a thorn-hedge near Oliver's Mount, Scarborough. The bird was very tame, and allowed me to watch it for some time. The berries on which it was feeding were swallowed whole, and, from the rapidity with which it ate, it must have been very hungry. Owing to the absence of a black throat, I judged it to be a bird of the year. The easterly gales of the previous week had no doubt something to do with its presence in this country. A. H. MEIKLEJOHN (20, Queen's Square, London).

Notes on the Swift and the Number of Days taken in Incubation. In some notes on this bird (Zool. 1900, pp. 479-81) I was unable in that year to give the exact number of days taken in the incubation of the eggs, owing to my absence from home during several days whilst the birds were in course of observation. During the present year I was similarly unfortunate, the eggs having been laid some days earlier than last year. This necessitated the robbing of the first laying.

April 20th.—First Swift observed flying over Wyre Forest, Bewdley; remarkably early.

June 2nd.—Two eggs taken from the nest in the roof of my house at Clent.

June 10th (7 a.m.).—Nest still remains empty.

June 11th (7 p.m.).—One egg in nest; both birds in nesting-hole, but I do not think incubation has actually started.

June 12th (7.15 a.m.).—One egg only in nest, and one of the birds in the nesting-hole.

June 13th (7.15 a.m.).—One egg. 6.15 p.m. Two eggs, and Swift evidently now sitting.

July 1st (9 p.m.).—One young and one egg in nest.

July 2nd (6.30 a.m.).—Two young in nest.

August 15th (7 p.m.).—One young, if not both, have left the nest, as only one bird occupies the nesting-hole, and possibly that one of the old birds.

August 16th (7 a.m.).—Nest empty.

August 18th.—Last Swift seen on the wing in this village.

September 2nd.—A Swift seen in the adjoining parish, at Lower Hagley; an unusually late occurrence.

From the above notes the time of incubation seems to be at least eighteen days, and during the present year the young did not leave the nest until six weeks, three days. In comparison, I might add that three out of a nest of four young Swallows were able to leave a nest situated in my outbuildings in three weeks, two days, or almost in exactly half the time.—J. STEELE-ELLIOTT (Clent, Worcestershire).

American Yellow-billed Cuckoo (*Coccyzus americanus*) at Ringwood.—On Oct. 26th a gentleman told me he had, whilst standing on one of the bridges watching some Pike-fishers, seen a strange bird settle upon and apparently scrutinize a bush at no very great distance from him. His description was that the bird was about the size of a Thrush, but seemed to have more the colour of the Nightingale on its sides, and a very long tail. As the late owner of Avon Castle had, a few years ago, liberated a number of Australian birds of various species, I supposed this might have been one of the very few survivors—if, indeed, any still survive—although I had no reason to suspect any bird answering the description had obtained its freedom. On Oct. 30th a specimen of the above-named Cuckoo was shot about half a mile from the spot, but whether the same bird it is impossible to say. I saw it soon after it was killed, and I may note the following particulars: Except where shot through the neck, the plumage appeared to be perfect, with no sign of abrasion either of wings or tail, as are seen in an "escape," and the body was fat and well conditioned, weighing just over $2\frac{1}{2}$ oz.; it measured $11\frac{3}{4}$ in. from beak to tail; the third quill-feather, the longest in the wing, being $5\frac{3}{8}$ in. from tip to carpal joint. Under mandible and base and sides of the upper, yellow; rest of the beak black. Eyes dark brown; eyelids bright yellow, reminding one of the Blackbird's. Back and two middle tail-feathers dark mouse-colour, with a tinge of reddish, especially on the tail; four outer feathers on either side blackish, with graduated dirty white markings,

the longest being merely and indistinctly tipped, and the shortest and outermost white its entire length, at least on the outer web. The reddish tawny mark in the wing was large and conspicuous, even when the wings were closed; but this may be a sexual characteristic, as on dissection it proved to be a male. The under parts from beak to tail were of an uniform pale grey, with a slight tinge of brown on the breast and sides. The legs (which were conspicuously longer than in the common *Cuculus canorus*, from the thigh-feathers to the toes) were bluish lead-colour, with a sort of silvery bloom on them, which latter soon faded; the claws were black, and it seemed to me the scales on the legs were remarkably large, as only five in number occupied the bare space. I should have mentioned, perhaps, that the beak was longer and more decurved than in the common species, and the inside of beak, which is well known to be bright orange-yellow in *C. canorus*, was conspicuously spotted with black, especially on the lower part of the palate, in the American bird. The tongue also had black markings on it. The bird had been feeding freely upon the grubs of some saw-fly, as the distended gizzard proved, the dark heads and spotted skins of the grubs being unmistakable. I had observed very similar, if not identical, grubs a few days previously upon a rose-tree, and wondered if the comparatively mild autumn had been favourable to the development of these particular flies, as several months ago the same tree was almost stripped of its leaves by what I suppose was the same species of larva. From the few ornithological works to which I have access, it seems that this wandering bird is only a straggler to these islands, and only in the autumn, mostly in October. The occurrence of this species in Hampshire is not exactly a first record, as a specimen is reported to have been found dead in the Isle of Wight in 1896 (Zool. 1897, p. 142), but no measurements or particulars of the bird were given except that it was a male. In 'The Zoologist' for 1895, p. 376, Mr. Harting gave us a lucid description, and some interesting notes on a specimen which had been picked up dead in Dorsetshire—this also in the month of October; and of the southern counties, Devon and Cornwall claim the species in their county list of birds.

Since writing the foregoing, I showed the bird to a man who is often near the river with his gun, and without hesitation he said he saw the bird, or another like it, more than a month ago, one evening when he was out duck-shooting, and should have killed it but for the large shot in his cartridges. This was some distance from where the bird was shot, so there might have been more than one in the vicinity. G. B. CORBIN (Ringwood, Hants).

Correction.—In a previous communication (*ante*, p. 428, three

lines from bottom), for "pink chocolate" read "pale chocolate."—(G. B. C.)

Little Owl at Henley.—I do not know what may be thought of the status of the Little Owl (*Athene noctua*) as a migrant, but I saw one to-day (Nov. 7th), shot yesterday at Wyfold Court, near Henley, Oxon. I do not think it is mentioned in Mr. Aplin's 'Birds of Oxfordshire.'—G. W. BRADSHAW (54, London Street, Reading).

Circus cineraceus in Northamptonshire.—A Montagu's Harrier in the plumage of the first year was shot at Whittlebury, near Towcester, about the middle of April, 1901, and came into my possession some months later. I am inclined to think it is a female. The late Lord Lilford only mentions ('Birds of Northamptonshire') one instance of the occurrence of this species in the county.—O. V. APLIN (Bloxham, Oxon).

Peregrine Falcon in Berkshire.—On Nov. 2nd last, a very fine adult Peregrine Falcon (*Falco peregrinus*) was shot at Aston Upthorne, near Wallingford, Berks, while being mobbed by Rooks. It was brought to me in the flesh.—G. W. BRADSHAW (54, London Street, Reading).

The Ringed-necked Duck as a British Bird.—I cannot understand why the Ringed-necked or Collared Duck should, by almost universal custom, be excluded from the number of accidental visitors on the list of British Birds. Donovan, in his 'Natural History of British Birds' (vol. vi. 1809), states that a specimen occurred to him in the month of January, 1801, among a number of wildfowl exposed for sale in Leadenhall Market. It was a male, and was supposed to have been taken in the fens of Lincolnshire. More than one species (*e.g.* the American Wigeon) has been admitted into the British list on claims no stronger than this. We may safely assume that a hundred years ago no wildfowl came imported for the table into the London market from the other side of the Atlantic. There can be no question about the bird having been correctly identified, for we have Donovan's coloured plate (No. 147) of this handsome Duck to refer to. The Ringed-necked Duck was at that date not merely a new British bird, but altogether undescribed. Donovan was accordingly the original describer of this species, and the name he then bestowed upon it still stands. *Fuligula collaris* (Donovan) is its name in the new Hand-List of Birds. This Duck, therefore, like *Botaurus lentiginosus*, is an American species first described from an example which had accidentally occurred in Europe. The Ringed-necked Duck has a wide distribution, and ranges, according to Dr. Elliot ('The Wildfowl of North America'), over the whole

of North America, from the Arctic Sea to Guatemala and the West Indies. Coues states ('Key to North American Birds') that it breeds from the north border of the United States to the far North, and winters in and migrates through the United States to Central America and the West Indies.—O. V. APLIN (Bloxham, Oxon).

Notes from Suffolk.—On Nov. 11th I visited the shop of a bird-stuffer in Woodbridge, and saw the following interesting specimens :—
1. A hybrid between the Blackcock and Pheasant. General plumage similar to that of a young Blackcock, and with the lyre-shaped outer tail-feathers just commencing to appear. Legs and feet not feathered, and distinctly those of a Pheasant. The bird, which was in immature plumage, was shot near Woodbridge this season, and is accounted for from the fact of a gentleman residing at Ipswich having turned down some black-game in that neighbourhood. A grey hen was found dead on the same ground a few days afterwards, which, although in good condition, appeared to have died from natural causes. 2. A hen Pheasant, shot near Woodbridge this season, in fawn-coloured plumage. 3. Two Montagu's Harriers, both males in full breeding plumage, killed in the summer of this year near Woodbridge by some unscrupulous keeper, notwithstanding the protection they are entitled to under the Wild Birds Protection Act.—E. A. BUTLER (Plumton House, Bury St. Edmunds, Suffolk).

Notes from Scarborough.—On October 2nd a fine pair (male and female) of Sooty Shearwaters (*Puffinus griseus*) were shot at sea, a few miles from Scarborough, by one of the crew of a Scotch herring-boat, and brought to me. Judging from the development of the sexual organs they were adult. This fine Shearwater has not previously come under my notice in this district. Another unusual species here, which has been noticed this season, is the Sandwich Tern (*Sterna cantiaca*), of which several examples have been seen, and three shot. This is also new to my list of local birds. Other interesting birds which have occurred at or near Scarborough this year are Montagu's Harrier (*Circus cineraceus*), caught in a post-trap in April last, and an adult Black Tern (*Hydrochelidon nigra*), shot on the Osgoodby Reservoir in the same month.—W. J. CLARKE (44, Huntriss Row, Scarborough).

Notes from Redcar, Yorks.—On Nov. 13th I procured, near Redcar, a fine immature male example of the Black Guillemot (*Uria grylle*). The same day several hundreds of mature Kittiwakes passed Redcar, going southwards. The weather was very stormy, and the birds had a hard battle against the strong north-east wind. On Nov.

15th I had brought me for inspection an immature Grey Phalarope (*Phalaropus fulicarius*), which had been shot on Coatham Sands, Redcar, on Nov. 14th. This bird proved upon dissection to be a female.—STANLEY DUNCAN (Redcar, Yorks).

Icelandic Names of Birds.—In the paper on my Icelandic journey (*ante*, pp. 401–419), the orthography of some of the Icelandic names of the birds is wrong, through no fault of mine, but, I presume, in consequence of the printers being unable to supply the proper letters. As an illustration, the Icelandic letter which looks somewhat like our P is a Th, with the result that the name of the Meadow-Pipit (*Anthus pratensis*) is not *Pufutitlingur*, but *Thufutitlingur*. For many years the name of the lake in the south of Iceland was printed in most English publications as “Pingvella”; its proper name is “Thingvetla.”—F. COBURN (Holloway Head, Birmingham).

[New type would have been required to print the Icelandic letters, and, even if the printers had been prepared to supply the same, time would not have sufficed, Mr. Coburn being very anxious for his paper to appear in the November issue.—ED.]

AVICULTURE.

Leadbeater's Cockatoo breeding in England.—By the kindness of a neighbour, who probably possesses one of the finest private collections of living *Psittacideæ* in this country, I was shown the other day three young Leadbeater's Cockatoos (*Cacatua leadbeateri*), which were hatched in the aviary last June. Two pairs of these birds are at liberty with many other species in a large outdoor aviary, constructed on the lines of the well-known aviary at the “Zoo,” and one pair selected an old hollow elm stump as a nesting-place. The cavity is nearly a yard deep, and in June three young birds were brought out at intervals of two days. These are now fine healthy birds, quite as big as their parents, but, so far as I could see in the failing light of a November day, rather duller in colour. Their owner believes them to be the first of their species reared in Europe, and would, I am sure, be much interested to hear of any similar instance, if such is known to any of your readers.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

Storm Petrel in Confinement.—Seeing some rough fishermen gathered in a group upon the Fish Wharf at Great Yarmouth on Oct. 16th, I naturally drew up, and to my amusement heard an animated and quaint discussion upon a poor little Petrel (*Procellaria pelagica*), whose tiny head peered out of a pastry bag, the mouth of which was

wisped around the neck like the trimmings around the foot end of a ham. After an exorbitant demand, the captor, on whose fishing boat the tired-out bird had alighted, parted with it for a shilling. I took it home, and after much persuasion succeeded in making it "suck" down a small quantity of herring milt, thrusting its bill in it up to the nostrils. Two or three attempts at this made the Petrel appreciate its meal, and it soon pecked the roe held upon my finger, next day feeding itself from a milt placed within its reach in my greenhouse. It was exceedingly eager to hide, and occasionally would run to and fro, carrying its wings erect and at an acute angle. When excited it uttered a peepy cry, very like that of a young Turkey. I had some hopes of rearing it, but it had evidently been too exhausted from the first to recover. It died within a week. Another was landed the day after I purchased mine. This species is nowadays very seldom seen in this neighbourhood. The only other interesting "arrivals" at the wharf, so far during this fishing, have been a Great Grey Shrike (*Lanius excubitor*), that came in on Oct. 31st, and which died just before it reached me.—ARTHUR PATTERSON (Ibis House, Great Yarmouth).

REPTILIA.

The Sand-Lizard in Berkshire.—Referring to Mr. W. H. Warner's note concerning the Sand-Lizard (*Lacerta agilis*) (*ante*, p. 392), the writer inquires whether the Sand-Lizard is known to occur in Berkshire. I may say that for many years I have been especially interested in this Lizard. Several years ago I took a small female among the furze at Cookham Dean, near Maidenhead. This was practically on the border between Berks and Bucks. I have also taken them on Maidenhead Thicket, though rarely. Across the river, in certain parts of Burnham Beeches, they are sometimes very plentiful. I think this lively little reptile may be met with in most parts, at any rate, of East Berkshire, though nowhere have I found it so common as on our south-western coasts. I remember, however, several years ago finding a large number at Southend-on-Sea. From my own experience it is far commoner and more widely distributed than the so-called Common Grass Lizard.—ERNEST S. LUMSDEN (Reading, Berkshire).

INSECTA.

Mosquitoes at Scarborough.—During the past three years local field naturalists have been plagued with swarms of Mosquitoes in several damp localities near Scarborough. These have this year been present in greatly increased numbers, and in several new localities,

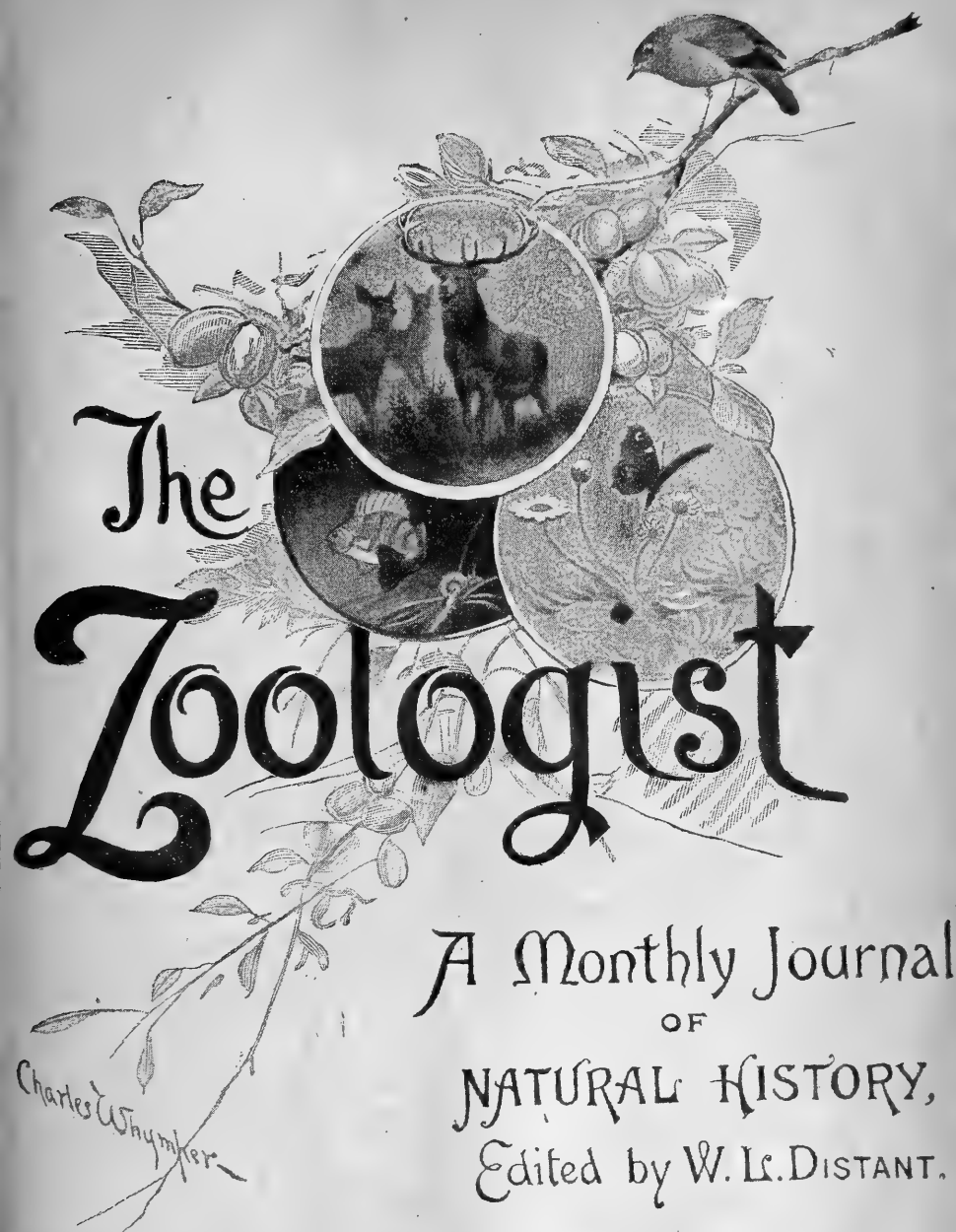
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and have in several instances penetrated into the town. I captured a number of these and sent them to Dr. G. Nuttall, of Cambridge, who has kindly identified them as *Culex annulatus*. The bite is very severe.—W. J. CLARKE (44, Huntriss Row, Scarborough).

BIOGRAPHY.

The Water Chanter of Turner.—William Turner, the first British naturalist of mark, was an accomplished physician as well as a member of Parliament. His residence at Wells enabled him to study the effects of the waters of Bath, and even to stay with patients in the latter city. He counselled close attention to diet, and advocated the use of Rhine wines. He approved of his Bath patients dining on small birds in general; "but *Water chanters* ye must not eat." Was the *Water chanter* identical with *Cinclus aquaticus*? He speaks of the latter bird as a "Water Swallow"; but perhaps he had heard both names employed to denote the same species. I should like to qualify my statement (*supra*, p. 379) that Turner "died a disappointed man." That the bitter disappointments which he experienced in middle life may have served to embitter his last years is not unlikely. He had returned home on the accession of Edward VI., after spending the best years of his life upon the Continent, with the full expectation that his talents would be recognized, and a high place assigned to him. But though he humbled himself to beg for preferment, he had some time to wait before he could secure the Deanery of Wells. Though he was obliged to accept it for family reasons, it brought him fresh worry. His predecessor was unwilling to give up his Deanery, and received the sympathy of the canons of the cathedral, who did not relish having a stranger thrust in upon them. Turner was once nominated for the Provostship of Oriel College, Oxford, as well as for the Presidency of Magdalen. Had he received the former appointment, Oriel would have been able to claim among the members of the college three illustrious naturalists—Turner, Thomas Pennant, and Gilbert White.—H. A. MACPHERSON (The Rectory, Pitlochry).

[A melancholy interest attaches to the above note, which was dated the 23rd November, and its writer passed away on the 26th—three days subsequently. "What shadows we are, and what shadows we become." In a letter received with this note, Mr. Macpherson discussed a future paper he was intending to write for 'The Zoologist.' We hope to give a full obituary notice of our old and much respected contributor in the next issue of the 'Zoologist.'—ED.]



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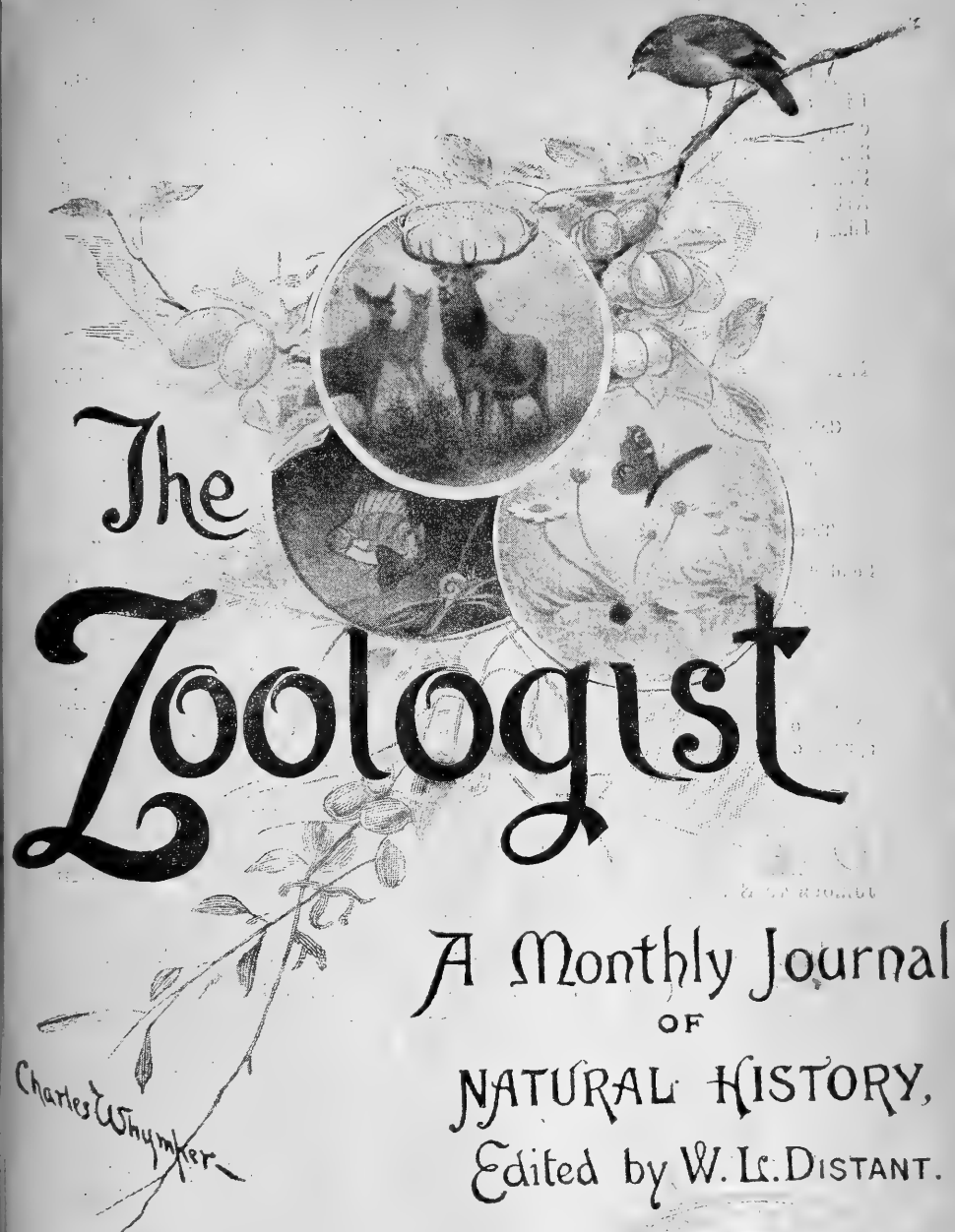
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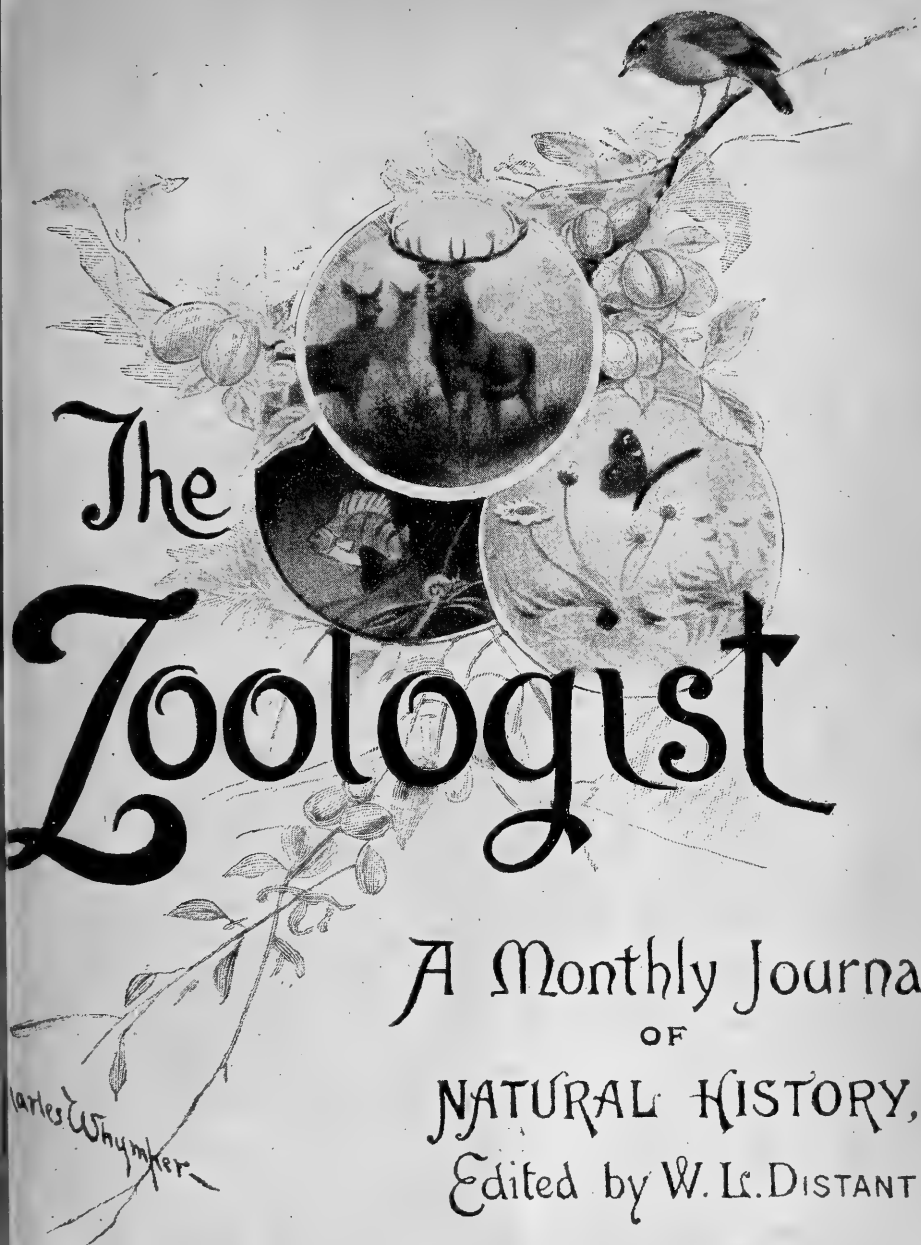
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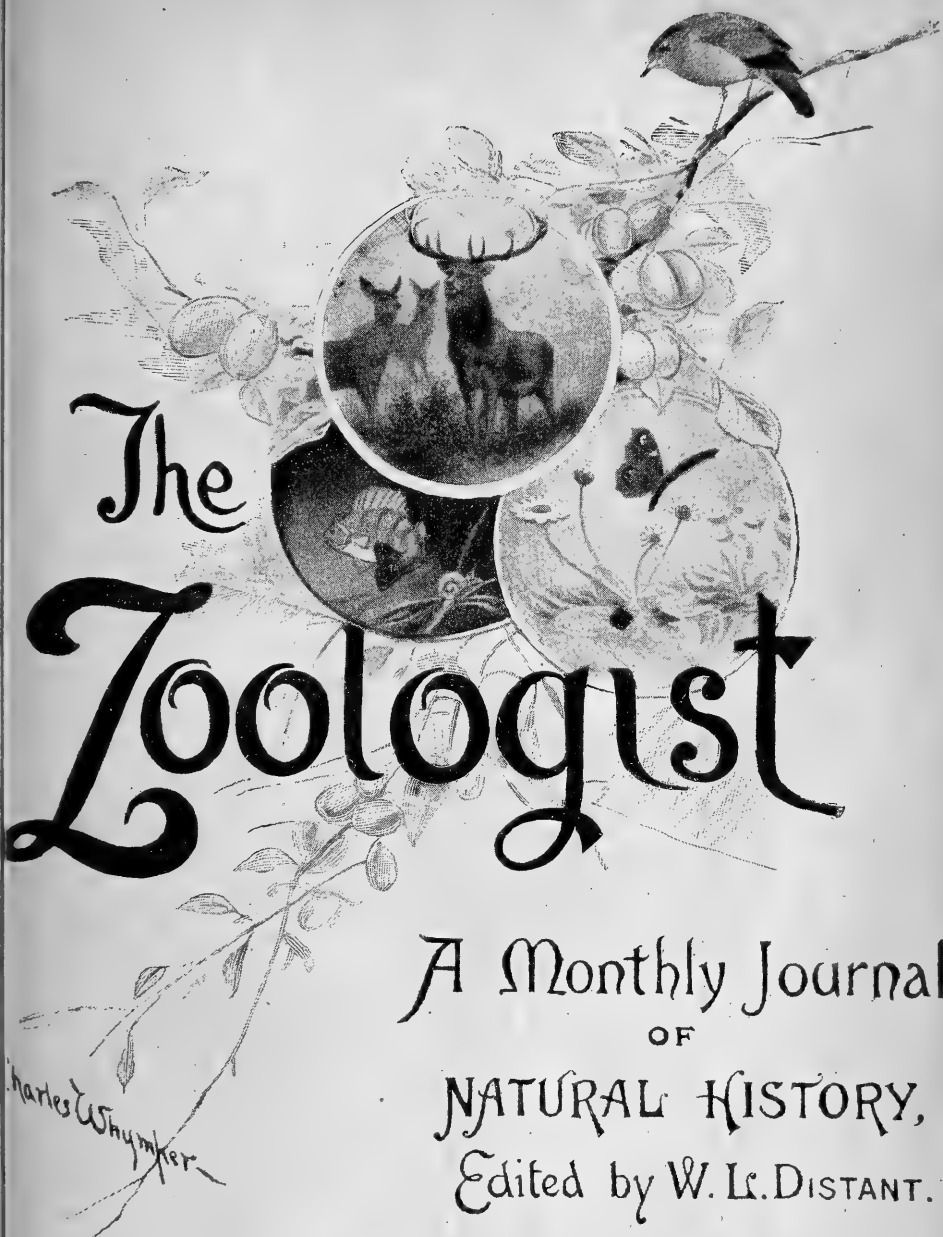
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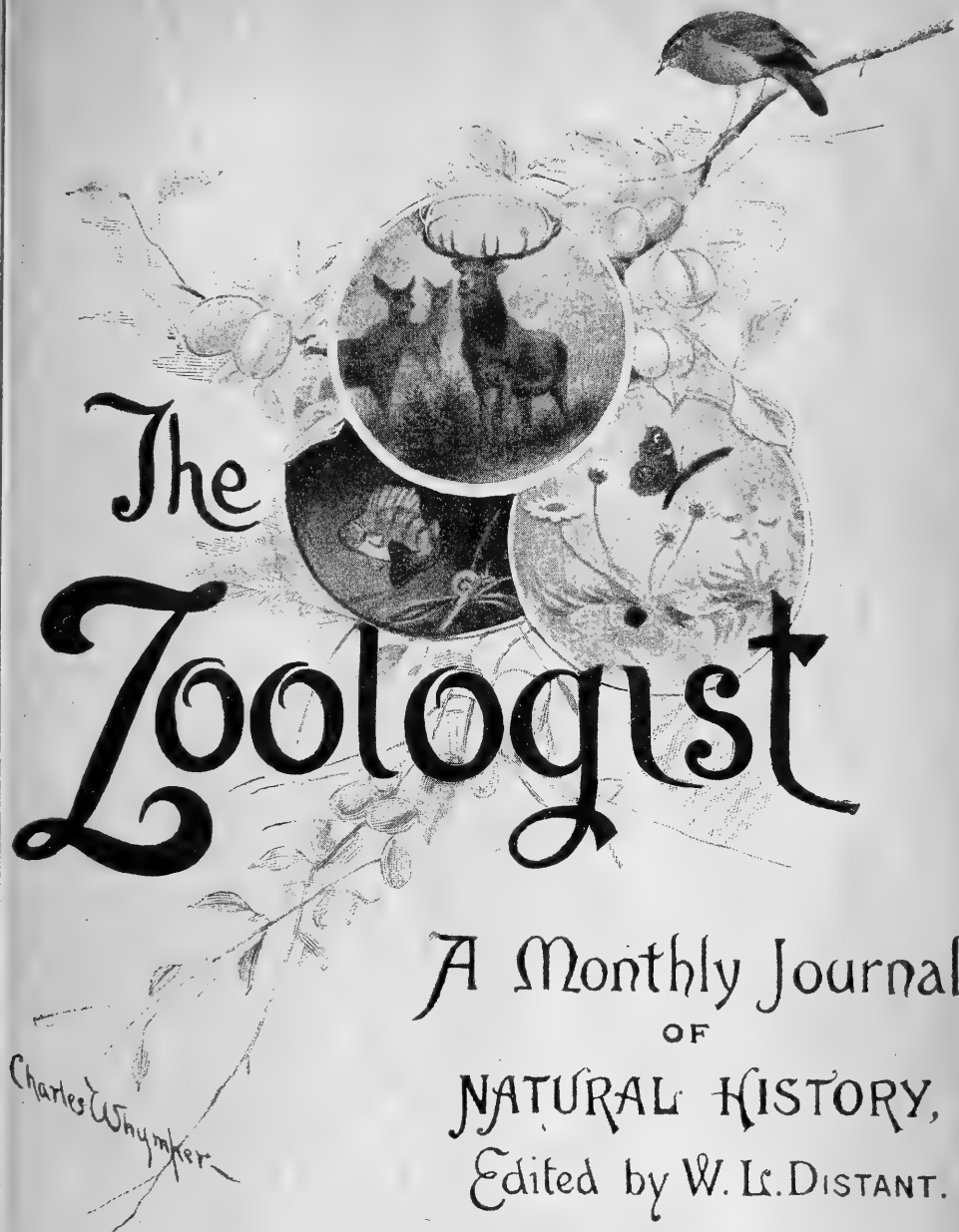
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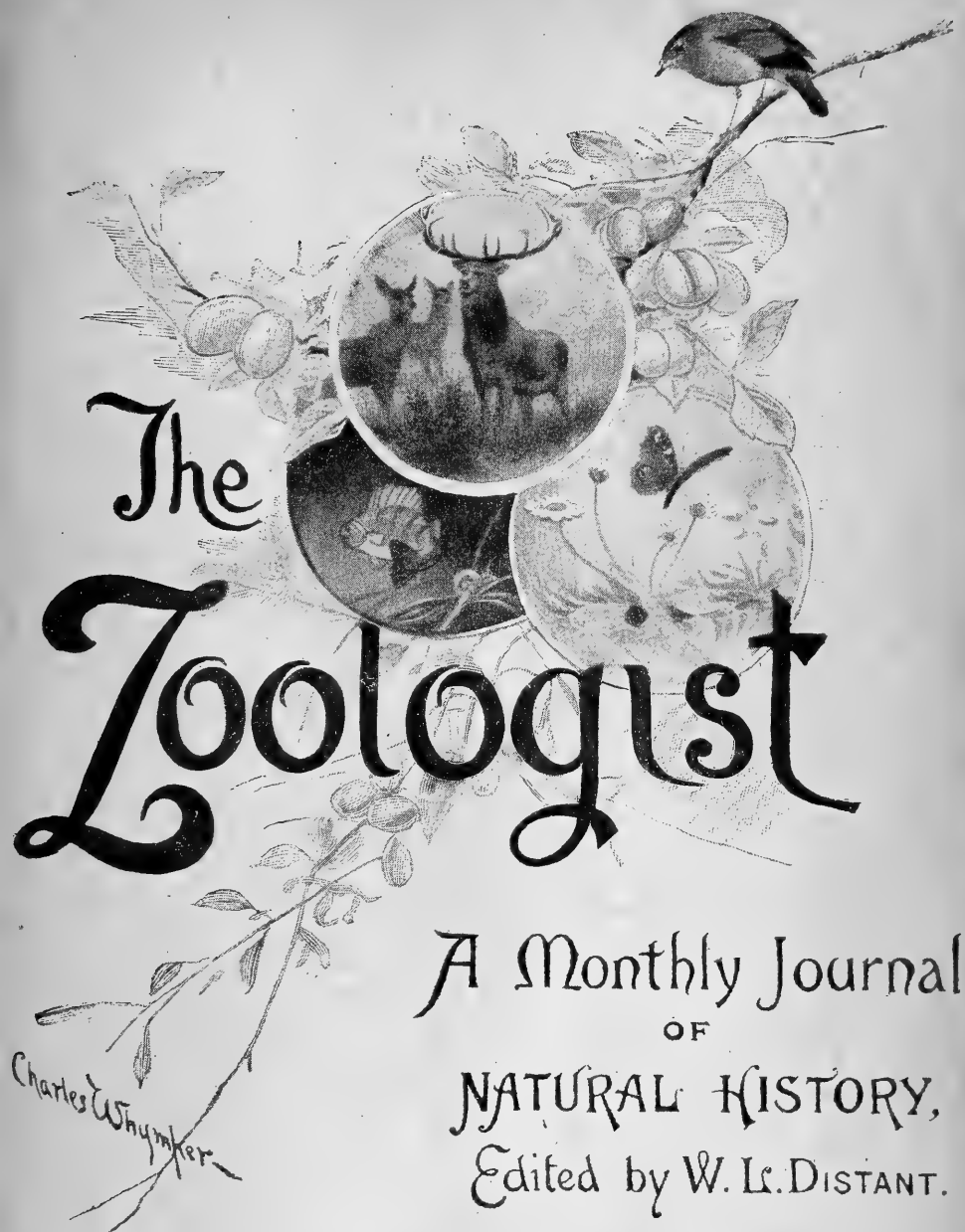
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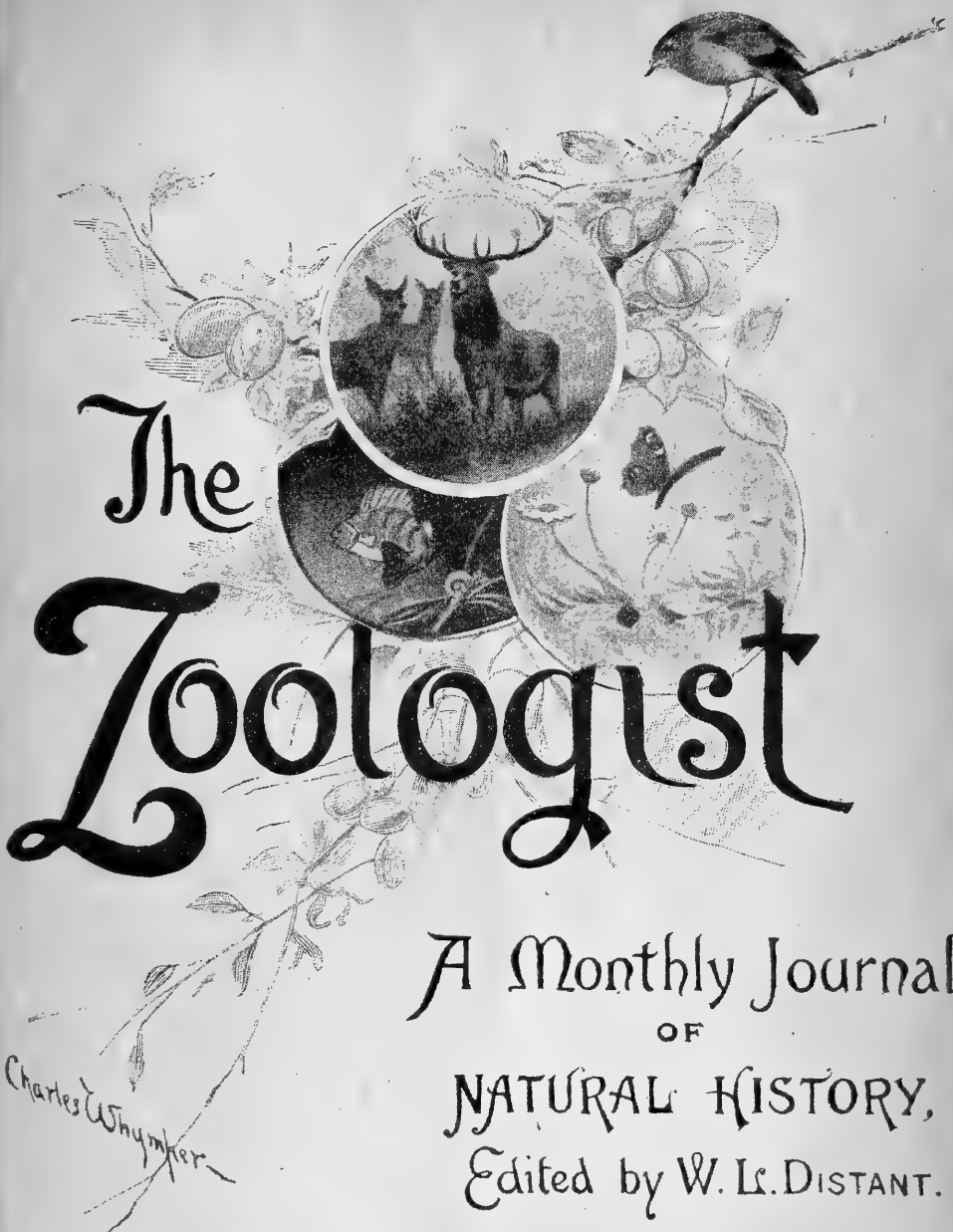
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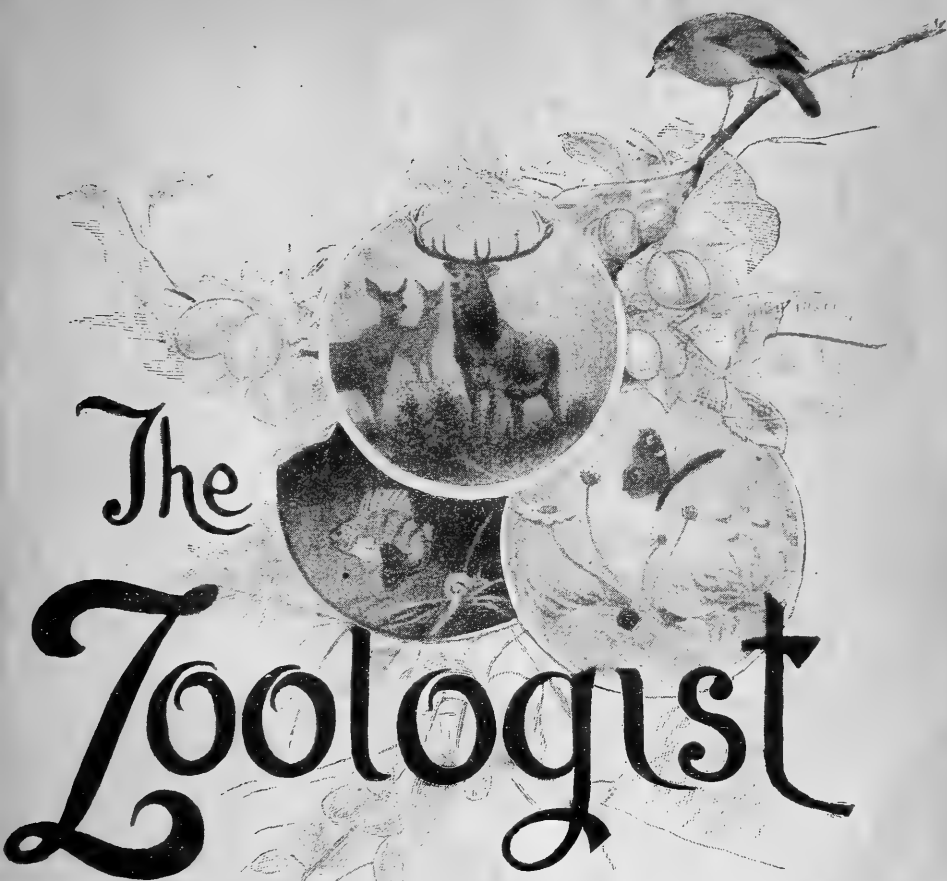
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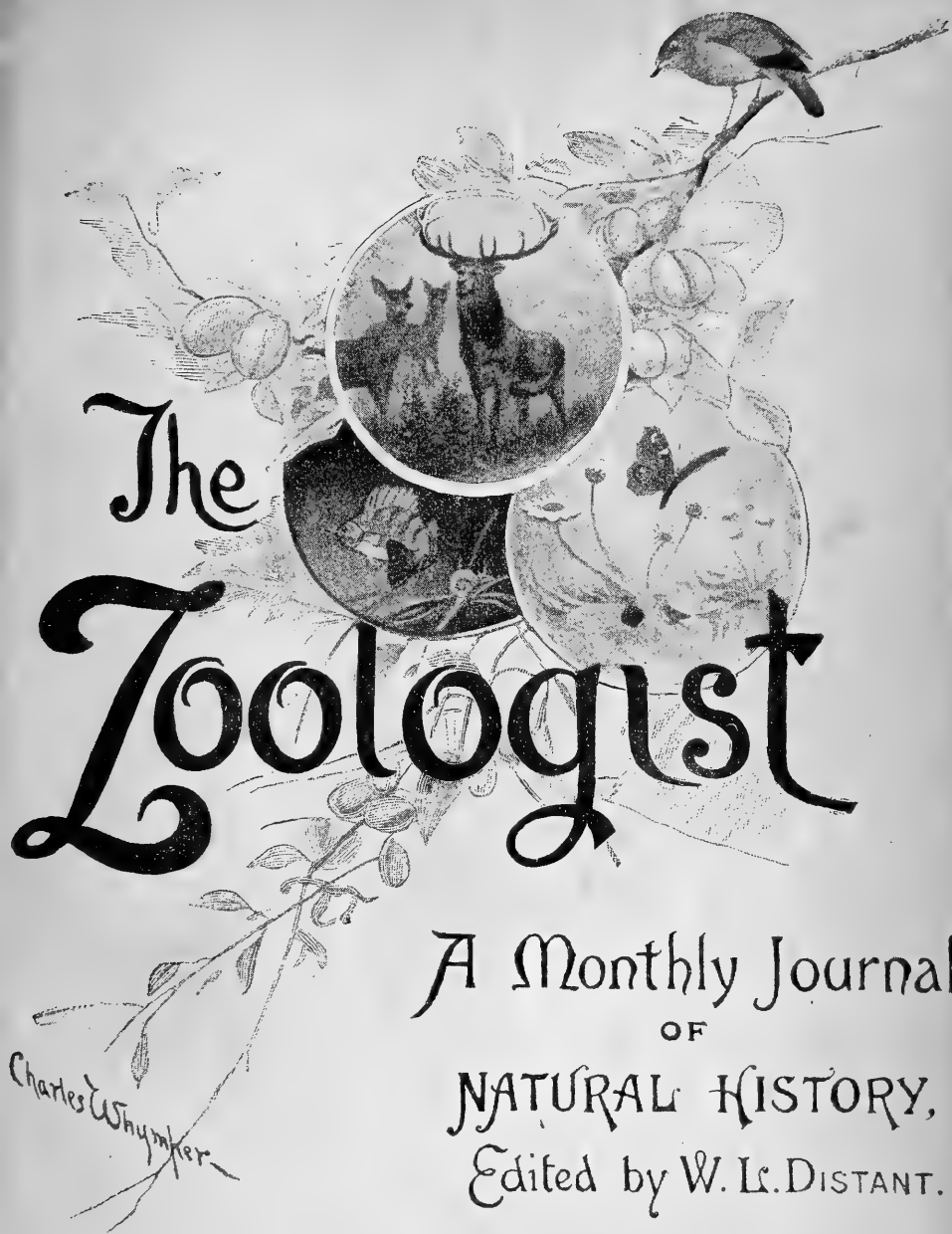
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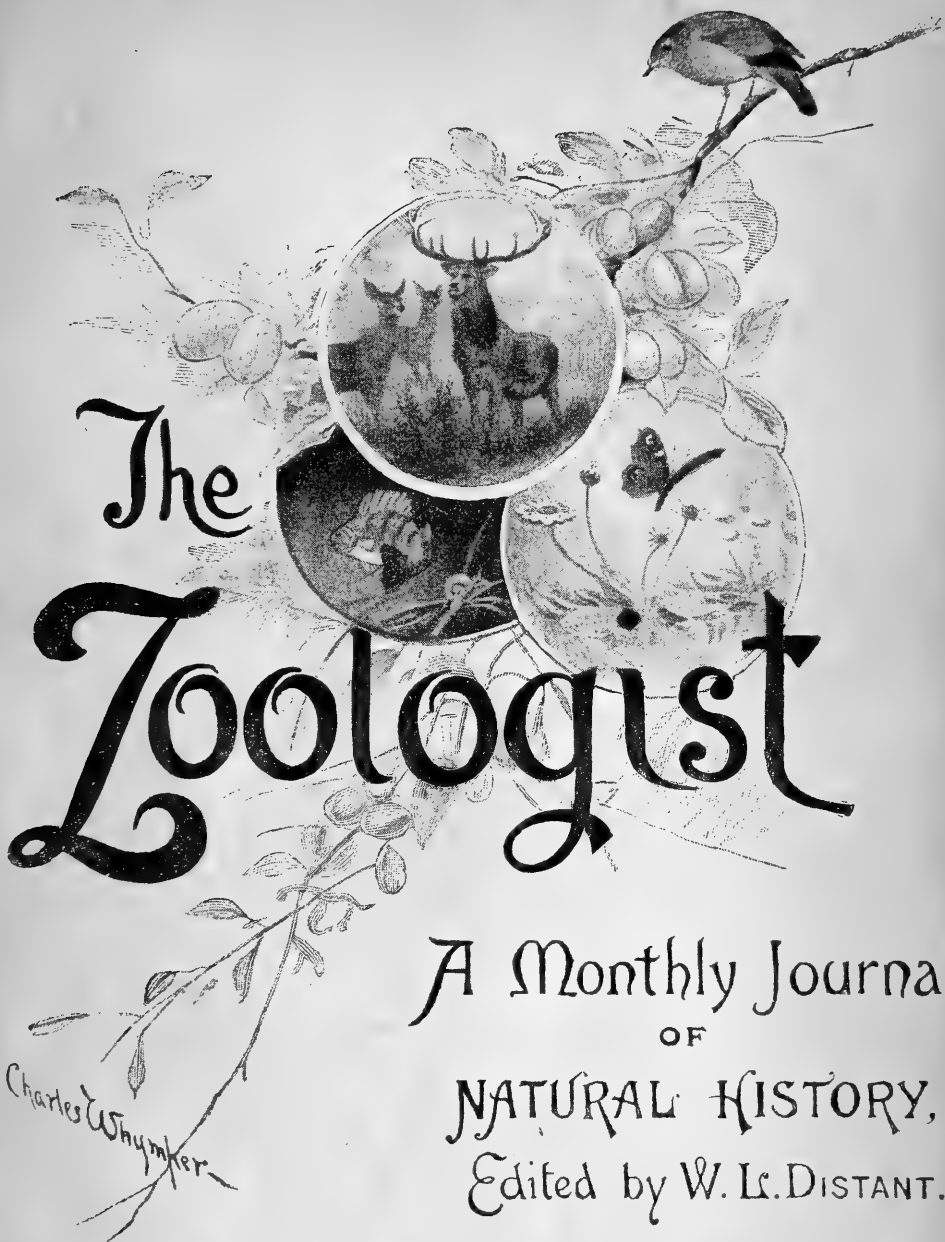
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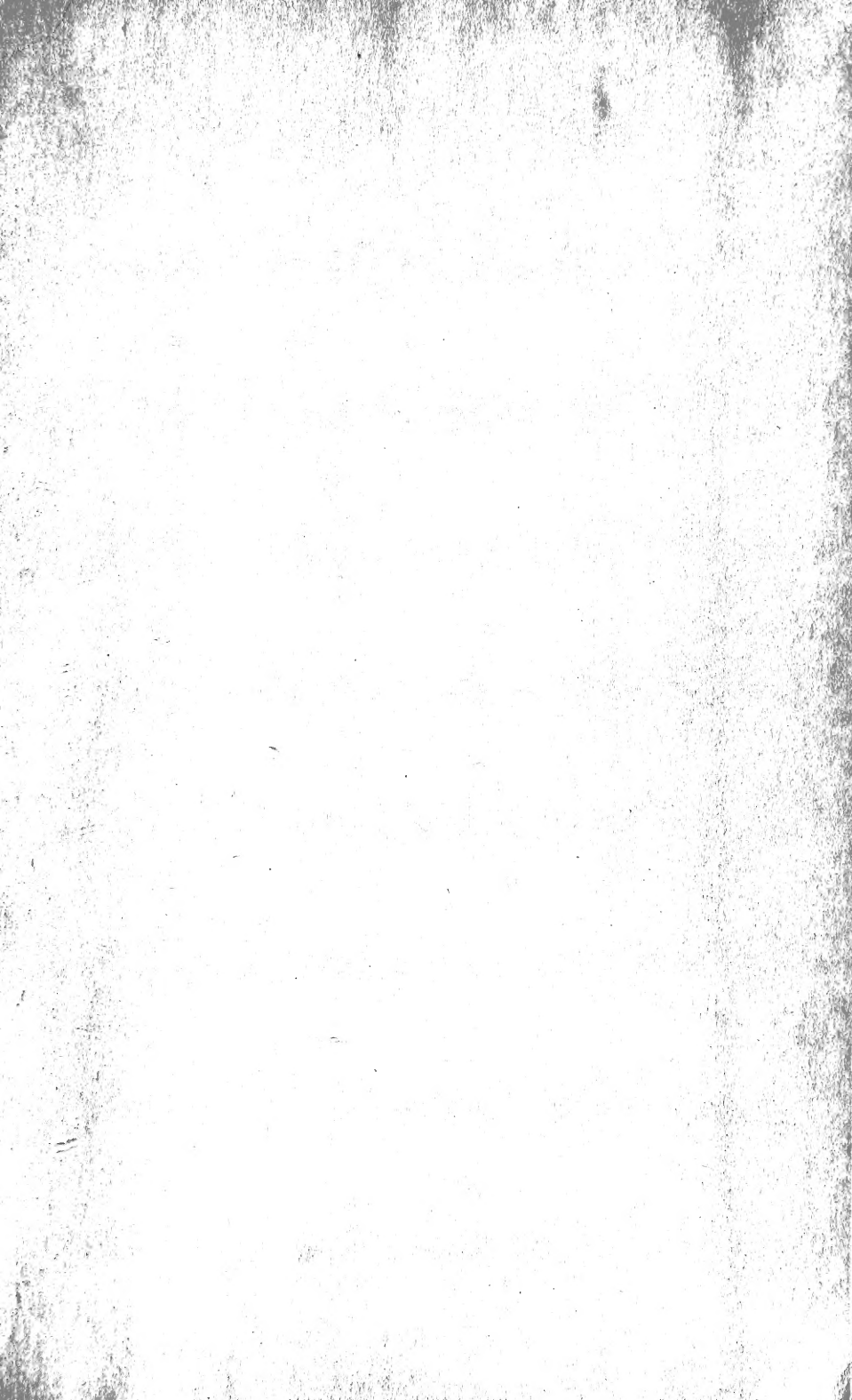
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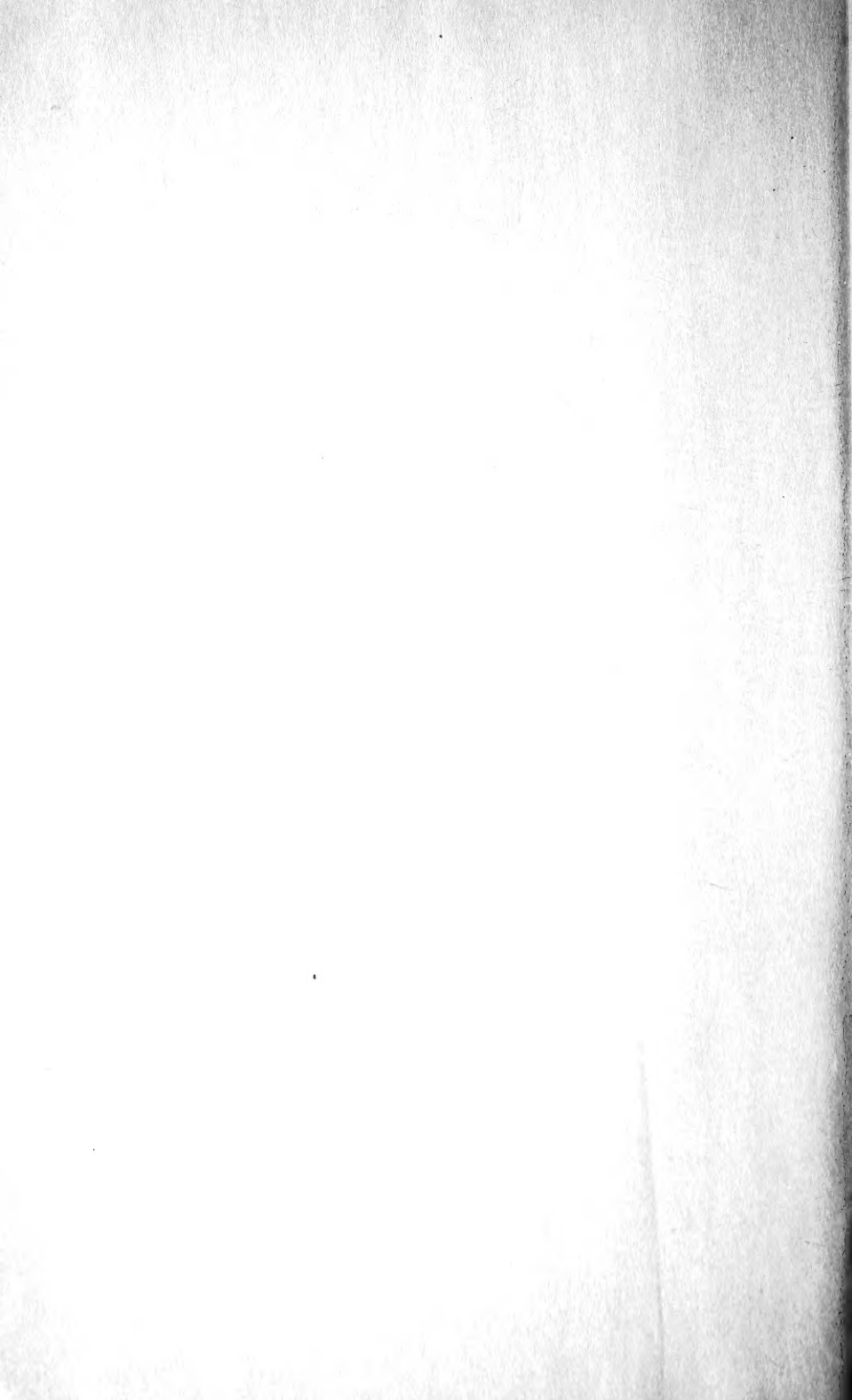
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